FINANCIAL RATIOS AND PROFITABILITY - STRATEGY FOR MID-LEVEL CONSTRUCTION FIRMS: GROWTH OR VALUE STRATEGIES?

A Thesis

by

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ABSTRACT

Construction firms are in one of the fiercest competitive industries in existence. These firms, like most businesses, operate towards the primary objective of making money. Financial strategy is thought to be a critical tool aiding firms in accomplishing this goal. Structured literature research indicates that the current construction literature does not address the topic of financial strategy in construction and how this can potentially impact overall firm profitability. Therefore, this study is intended to fill this gap and to lay the groundwork for future research on the topic. The aim of this study is three-fold, first to analyze the statistical correlation between profitability and the presence of financial strategy. Second formulate a strategic suggestion framework based on current financial position. Third to fill the industry literature gap regarding financial strategy.

Using Pearsons correlation and ordinary linear regression analysis, this study found that no significant correlation existed between the selected profitability metrics and five financial ratios selected to indirectly indicate the presence of financial strategy. However, based on a structured literature review and metonymic mapping, a strategic selection framework was created to suggest a firm's pursuit of either growth or value strategy. These statistical analysis and subsequent findings would indicate that a more direct method of determining the presence of financial strategy within a firm is needed in order to firmly establish the impact of financial strategy on firm profitability. The framework created from this study contributes to the construction literature by filling an apparent gap and establishing a basis from which other studies may evolve.

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TABLE OF CONTENTS

Page

ABSTRACT ii

ACKNOWLEDGEMENTS iii

CONTRIBUTORS AND FUNDING SOURCES iv

TABLE OF CONTENTS v

LIST OF TABLES vii

LIST OF FIGURES viii

NOMENCLATURE ix

FINANCIAL METRICS x

1. INTRODUCTION AND BACKGROUND 1

2. PROBLEM STATEMENT 5

3. RESEARCH OBJECTIVES 6

4. REVIEW OF LITERATURE 8

4.1. Strategic Management in Business 10
4.2. Strategic Management in Construction 11
4.3. Financial Strategy in Business 12
4.4. Financial Strategy in Construction 13
4.5. Financial Metrics 15
4.6. Growth vs Value Strategy 17

5. RESEARCH LIMITATIONS 20

6. RESEARCH METHODS 22

7. RESEARCH RESULTS 24

7.1. Statistical Data Analysis 24
7.2. Strategy Framework 29

8. CONCLUSION 34

8.1 Study Conclusions 34
8.2 Significance of Thesis and Future Research 36

REFERENCES 37

APPENDIX 1 - TABLES 43

APPENDIX 2 - FIGURES 50

APPENDIX 3 – LITERATURE REVIEW EXCEL PROCESS 54

APPENDIX 4 - EXTENDED LITERATURE REVIEW 55

APPENDIX 5 - COMPLETE STATISTICAL ANALYSIS OVERVIEW 95

LIST OF TABLES

		Page
Table 1	Segmentation of Firm Size by Annual Revenue	43
Table 2	Fundamental Journal Papers Part 1	44
Table 3	Fundamental Journal Papers Part 2	45
Table 4	Search Engines Utilized	46
Table 5	Keywords Used	47
Table 6	Growth and Value Strategy Elements	48
Table 7	Summary of Correlation for GP with Variables of Interest	48
Table 8	Summary of Correlation for NIBT with Variables of Interest	49
Table 9	Structured Literature Search Iterations	49

LIST OF FIGURES

Page

Figure 1 Flow of Seminal Literature Publications 50

Figure 2 Pearson Correlation Test (Example) 50

Figure 3 Financial Strategy Recommendation Framework 51

Figure 4 Growth and Value Strategy Firm Examples 52

Figure 5 Profitability Distributions 52

Figure 6 Financial Ratio Distributions 53

NOMENCLATURE

CFMA	Construction Financial Management Association
FS	Financial Strategy
S	Firm Size
GP	Gross Profit
NIBT	Net Income Before Taxes
D/E	Debt-Equity Ratio
QR	Quick Ratio
WCT	Working Capital Turnover
ROA	Return on Assets
ROE	Return on Equity
NPM	Net Profit Margin
TAT	Total Asset Turnover
MANOVA	Multiple Analysis of Variance
PC	Pearson Correlation
OLC	Ordinary Linear Regression
TC	Total Cost

FINANCIAL METRICS

Profit Margin	Net Income ÷ Revenue
Gross Profit	Revenue – Total Costs
Net Income (Loss) Before Taxes	Gross Profit – Overhead Expenses
Working Capital Turnover	Revenue ÷ Working Capital
Quick Ratio	(Cash and Cash Equivalents + Short Term Investments + Net Receivables) ÷ Current Liabilities
Debt-to-Equity Ratio	Total Liabilities ÷ Total Net Worth
Return on Assets	Net Income before Taxes ÷ Total Assets
Return on Equity	Net Income before Taxes ÷ Total Net Worth

1. INTRODUCTION AND BACKGROUND

Construction firms like all businesses, possess a fundamental goal to be profitable and to maintain this profitability. In light of the economic recession of 2008, many construction firms had to downsize substantially or even shut down completely, particularly in the United States. Per a 2012 release by the U.S. Bureau of Labor Statistics, the construction industry suffered the single largest decline in employment rate at 13.7 percent (2012)[(1)] from 2007-2009.

By nature, the construction industry is one of the most competitive. According to data collected by the U.S. Census Bureau, only 36.4 percent [(*2)] of construction firms survive past 5 years. Due to the competitiveness of the industry the need for bona fide business strategy appears obvious, and more specifically the need for financial strategies becomes even more apparent in the capabilities-driven competitive market in which construction firms operate. Yet in review of many construction industry related journals, to the best of this thesis knowledge, little literature exists regarding financial strategy as a function of strategic management and its impact and correlation to overall profitability. Ercan states that "possessing formulated financial strategies is essential for obtaining competitive advantage" in the highly competitive construction industry where even the largest construction companies (i.e. Bechtel, Fluor, and Turner- [Top 3 US Contractors]) only achieve on average 4-5% profit margins (Ercan and Koksal 2013). Presently the

[1] "The Recession of 2007 - 2009." U.S. Bureau of Labor Statistics

[2] *Business Dynamics Statistics* United States Census Bureau

"Tier 1" level firms, as they shall be referred henceforth (Table 1), employ various financial strategies, the "Tier 2" or "middle-market" firms, do not. Yet according to financial data compiled by the Construction Financial Management Association (CFMA), many of these "Tier 2" firms demonstrate the most capacity to implement financial strategy. These "Tier 2" firms are the most intriguing and represent the most competitive firm level in the industry. Many of the "Tier 2" firms are second or third generation companies that have accumulated or gained access to both the human and financial capital required to implement common and the most historically successful financial strategies found in businesses.

TABLE 1 Segmentation of Firm Size by Annual Revenue

Tier 3 Firm	**Tier 2 Firm**	**Tier 1 Firm**
Annual Revenue < $50 MM	Annual Revenue $51MM < AR < $500MM	Annual Revenue > $500MM

Michael E. Porter,in his highly regarded book, *Competitive strategy: Techniques for analyzing industries and competitors,* outlines three basic classifications of strategy (Porter 1980). These are "(1) Cost Leadership- emphasizing cost reduction of its products and services; (2) Differentiation- offering the customer a special value by stressing quality, performance, or service; and (3) focus- targeting a selected segment of the market in terms of location, product, or group of customers" (Warszawski 1996).

The desired purpose of this thesis is to fill an apparent gap in construction literature by analyzing survey data from the CFMA and examining the correlation between two profitability metrics and five common financial ratios: Gross Profit **(GP),** Net Income before Taxes **(NIBT)**, and Debt to Equity Ratio **(D/E)**, Quick Ratio **(QR)**, Working Capital Turnover **(WCT),** Return on Assets **(ROA)**, Return on Equity (**ROE**)**.** This thesis also analyzed the correlation of Firm Size **(S)** to each of the two profitability measures as well. The main idea in selecting these particular common financial metrics and ratios lies in their ability to reflect a firm's current financial position and ability to implement any specified financial strategy within two different strategy categories: Growth strategies and Value strategies.

Before this thesis can go any further, it is important to first simply define the terms Growth and Value strategies. Later these strategies will be defined more specifically pertaining to this thesis. This thesis used a concept called metonymic mapping, which draws an idea or ideas from one discipline and applies it to another. This concept will be explained more fully in the following sections. Growth and Value strategies are commonly used stock market investment strategies. Growth strategy simply refers to an investor identifying companies that are growing quicker than the market and purchasing their stock. Value strategy is when investors seek companies whose stocks are undervalued, and thus comparatively cheaper than their competitors, yet have strong financials as well as showing positive signs of improvement and holding these stocks until they grow substantially.

This thesis goal is to conduct this examination with respect to two primary categories of financial strategies, Value and Growth. The first is 'Value' strategy based upon Porter's "Focus" and "Cost Leadership" strategies. By analyzing a firm's WCT and QR, among other factors, it is possible to determine a firm's ability to increase its value (and market competitiveness) in various ways purely due to its strong (or weak) financial position. By implementing a companywide financial strategy pointed at short-term benefits and long-term growth, a "Tier 2" firm can utilize these strategies as a method of increasing market capture rate, increasing firm valuation, and improving its financial position. The Second category is 'Growth strategies,' based upon Porter (1985)'s "Differentiation" and "Cost Leadership" strategy types. In reviewing a firm's D/E ratio, WCT, and QR, it is again possible to make an assumption, based on a firm's financial position, of its ability to implement a firm-specific strategy to increase its size and perhaps scope, depending on the firms confidence in its relative financial position.

Furthermore, not only does a firm benefit from strategic financial management in terms of its competitiveness, but the better a firm's financial position and strategy is, the more risk it can take on in the form of higher risk-higher reward jobs. Strategic financial management will also enable floating elevated growth rates year over year and the increased financial strain accompanied by this to in turn achieve overall increased revenue and higher profit margins. To summarize the words of Ercan and Warszawski, construction firms who employ defined financial strategies enjoy a better overall financial position with respect to the management of risks (higher returns) and openness to new and innovative ideas (Ercan and Koksal 2013) & (Warszawski 1996).

2. PROBLEM STATEMENT

A review of literature in the construction industry indicates an apparent gap in the industry literature regarding financial strategy and the correlation between: Debt/Equity Ratio (**D/E**), Working Capital Turnover (**WCT**), Quick Ratio (**QR**), Return on Assets (**ROA**), Return on Equity (**ROE**) and Profitability (**P**) {both Gross Profit (**GP**) and Net Income Before Taxes (**NIBT**)}. This thesis emphasizes the idea of financial strategy in construction and highlights examples of financials for those companies who appear to have implemented a type of financial strategy, including the benefits of said strategy. This thesis also presented a framework to offer suggestion of pursuit of one of the above described strategy categories.

3. RESEARCH OBJECTIVES

This thesis accomplished three tasks: first, the above specified financial ratios and metrics of construction firms who participated in the *2016 Construction Financial Benchmarker* report in order to examine the correlation between the specified financial ratios to Gross Profit and Net Income before Taxes. Of the 870 construction firms who participated, this thesis limited its scope of examination to only 366 firms who identified themselves as either "Construction Manager" or "General/Prime Contractor," excluding "Subcontractors" and "Other" classifications. The aim of this statistical analysis was to highlight two things: first, to determine if a positive correlation existed between Gross Profit, Net Income before Taxes and Debt to Equity, Quick Ratio, Working Capital Turnover, and Return on Assets. If any such relationship existed, the second task would have been, by piggy-backing off of previous literature in an extensive literature review, to point out the positive correlation between defined financial strategy and increased profitability. The second task of this thesis was to provide a simple framework which recommends pursuit of one of the two strategy categories for the "Tier 2" firms who are in a financially ready position (as determined by the specified ratios), allowing them either to pursue growth in firm size or scope (Growth) or increase their market value and competitiveness (Value), both of which contribute directly to the bottom line. The last task was to fill the gap in the current construction industry literature specifically regarding financial strategy.

A quote by motivational speaker and self-development author Brian Tracy addressing succeeding on a grand scale can be applied to businesses and can simply

summarize this thesis goal: “What does it take for most of us [as well as businesses] to succeed on a big scale? ...it takes something very simple and accessible: clear, written goals.”

4. REVIEW OF LITERATURE

In searching the available literature and relating to the selected topic for this thesis, 74 sources have been referenced not only in the construction discipline but in several other areas as well. To vary and diversify the search, seven different search engines (Table 4) and approximately 147 keywords (Table 5) were used. Five keywords proved to be most relevant: Strategic Management, Business Strategy, Competitive Forces, Financial Strategy [in Construction], and Internal Rate of Return.

In thoroughly reviewing the literature on the topics of strategic or financial management in construction related journals, it was discovered that strategic management concepts have a significant presence among the construction literature. Yet there appears to be a gap regarding financial strategy, particularly regarding financial strategy and its correlation to profitability. It should be noted that recent attempts to fill this gap have been made in relation to large publicly traded construction firms (Cheah et al. 2007) and the impacts of growth and competitive strategies on general financial strategies (Ercan and Koksal 2013). The following literature review utilizes a variation of the concept known as 'metonymic mapping,' which is a method of conceptual blending that pulls concepts from an array of disciplines in order to form a concept that has not been present previously in a specific area of research. The literature review is

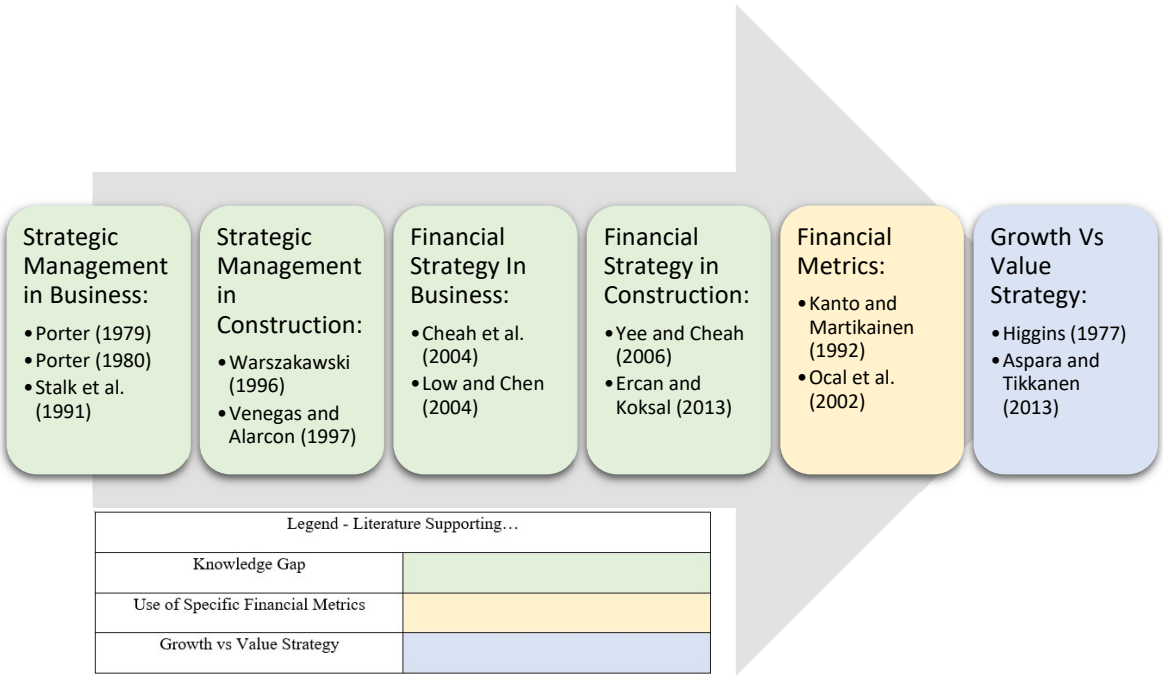


FIGURE 1- Flow of Seminal Literature Publications

broken into six sub-parts: 4.1) strategic management in business, 4.2) strategic management in construction, 4.3) financial strategy in business, 4.4) financial strategy in construction, 4.5) financial metrics, and finally 4.6) 'Growth' versus 'Value' strategy. Figure 1 visually shows the six parts in their logical, sequential order, along with a few principle articles in each area. Table 9 breaks down the number of journal papers that this thesis studied and referenced, both totals as well as per section, as a part of the structured literature review process.

4.1. Strategic Management in Business

The idea of strategy has been around since the time of the ancient Greeks, and historically has been referred to in terms of military scheming or planning. Ghemawat (2002) addresses the fact that strategy in terms of business has only been around since the twentieth century. Two early events, the development of railroads and World War II, discussed in Ghemawat (2002)'s work helped to bring strategy to the forefront of business thought.

This concept of strategy was turned on its head with the introduction of Michael Porter's paper in 1979 on how competitive forces shape strategy (see Appendix 2). Porter (1979) posits that the executive management's goal should be to identify the firm's strength, and position itself where it can best defend itself against these forces. Stalk et al. (1991) introduces a new, more dynamic idea called 'capabilities-based competition:' "In industry after industry, established competitors are being outmaneuvered and overtaken by more dynamic rivals" (Stalk et al. 1991).

"[Strategic] Business models are abstracts about how inputs to an organization are transformed to value adding outputs" (Betz 2002) and(Porter 1981). The sole purpose of a business to make a profit and to maintain this profitability for as long as it can. Boiled to its simplest, strategic management is considering how a business makes money in the present, and how it must adapt to continue making money in the future. In summary, this creation of a specific and innovative plan is strategic management.

Christensen et al. (2002) lists four components that management should use to build a successful innovative strategic growth plan: start before you need to, establish an

'aggregate project plan,' train people to distinguish between disruptive and sustaining ideas, and finally, create processes for shaping disruptive business plans.

4.2. Strategic Management in Construction

One of the first and most commonly cited in construction industry journals relating to strategic management is Abraham Warszakawski's "Strategic Planning in Construction Companies" (Warszawski 1996). Strategic planning is an invaluable resource to a firm and should be an essential responsibility of a construction firm's management, but "realization of strategic plans require investment" (Warszawski 1996).

According to Price and Newson (2003), historically construction organizations have focused on improving their project organizational effectiveness at the expense of long-term strategies. But to be successful in the future, firms need to supplement these short-term project effectiveness strategies with long-term strategies. Price and Newson (2003) and Kazaz and Ulubeyli (2009) present and discuss strategy and elements of strategic processes along with a framework that can assist a firm in developing and subsequently testing a firm's strategic plan to determine whether it can bring greater success to that firm. Venegas and Alarcón (1997) outline a framework that offers construction firms a path to follow during the evaluation and selection of a strategic plan.

Innovation is a vital tool in the arsenal of firms in terms of growth, competitiveness, and market creation and is valuable to a firm for many reasons, such as to improve its internal efficiencies and processes and/or improve its market competitive

advantage (Slaughter 2000). Innovation can come in many forms, such as product innovation, process innovation, or most notably, strategic management innovation (Ozorhon et al. 2015). Chinowsky and Meredith (2000) posits that the skills and strategic capability to identify and pursue a firm's own set of opportunities is critical and must be included in the strategic plan development of construction firms.

By adopting a corporate level view of strategic management, along with strong leadership and vision, construction firms can rise to the top of their industry and remain there by developing dynamic strategic plans that allow them to respond to the constant changes in the construction market.

4.3. Financial Strategy in Business

In the last twenty years, firms have become increasingly aware of their financial resources and capabilities, and the returns that can be drawn from strategic management of these assets. Krumm et al. (1998) states that firms who think to only provide cost effective and quality products and services are finding that this is no longer a guarantee to success. Rather, the ability of these firms to create value from their internal capabilities and resources is becoming more so the lynchpin of success (Dierickx and Cool 1989).

The research by Low and Chen (2004) thesis both domestic U.S. firms as well as multinational U.S. firms that are either product focused or product diversified and how these characteristics impact a firm's capital structure. Of particular importance to the construction industry is that this thesis's results indicate that product diversification is

positively correlated to financial leverage, meaning that product (or market) diversification allows firms to reduce their risk. This could potentially be very impactful to construction firms. The capital structure (and financial soundness) of a firm should be viewed as one of these important capabilities that is vital to a firm regardless of industry, as it impacts the firm's day-to-day operations as well as has the power to create or restrict growth opportunities for the firm. An important note made in this thesis is that Barton and Gordon (1987) point out that a firm's strategy should "complement and enrich" a firm's understanding of the firm's capital structure decisions. Relevant to the construction industry, this means that due to the dynamic nature of the industry and the importance of cash to meet short-term liabilities (i.e. payments for materials and to sub-contractors), firms should match their leverage ratios to their external environment and strategic goals.

Once again, regardless of industry, the competitive business environment that exists today demands that firms go beyond simply competing on products or services, but also competing in terms of its capabilities. This fact illustrates the importance of every construction firm pursuing defined and specific financial strategy in order to use the resources available to them most efficiently (Cheah and Garvin 2004).

4.4. Financial Strategy in Construction

Strategy has been a way for other industries to navigate their competitive environments, and many construction firms should try to emulate due to the heightened competitive environment in existence today (Cheah et al. 2007). A major factor

indicative of success in business, and specifically the construction industry, is a firm's ability to strategically manage its direction, growth, and the risks that are associated with these actions.

Yee and Cheah (2006) explore the relationships between two specific business strategy types (product-market diversification and internalization) and two financial strategy elements (asset liquidity and firm capital structure). In summation of their work, Yee and Cheah (2006) suggest two paths to firms based on their findings. First, if a firm cannot increase its liquidity, or is already in a lower liquidity position, it would perhaps be better to pursue the diversification strategy. Alternatively, those firms who find themselves enjoying higher liquidity, and in a less levered financial position, should perhaps actively pursue the internalization growth strategy as they have more of a financial cushion to mitigate the inherent risk that is associated with this type of strategy.

Ercan and Koksal (2013) thesis the effects of strategic growth and competitive strategies on a set of financial strategies. This thesis is one of the first in the industry to begin exploring the connection between strategic management practices and financial strategy and theory. "Under these new and competitive market conditions, construction companies are expected to have pre-designed planned growth and financial strategy" (Ercan and Koksal 2013). In summary, Ercan and Koksal (2013) state that the capital structure and solvency strategies (long-term, where liquidity status equals short-term) are of relatively higher importance for gaining a competitive edge in the construction industry, where the "Differentiation" strategy (Porter 1980), is the most common.

Cheah et al. (2007) present five types of general strategies based on the works of {(Porter 1980); (Kale and Arditi 2002); and (Cheah 2002)}. These include cost leadership, differentiation, geographic diversification, market/product diversification, and functional diversification or vertical integration. When choosing the type and building blocks of strategy formulation along with the mode and scope of competition, research such as Cheah et al. (2007)'s can assist a firm by providing empirical evidence of the strength of certain types and elements of strategy. As revenue, and subsequently profit growth, is the primary goal for every business, developing a strong financial strategy to navigate today's business environment becomes ever more important.

4.5. Financial Metrics

Financial ratios are a valuable tool for any business due to their ability to assess a firm's capabilities to meet debt obligations, meet statutory requirements, and evaluate the firm's performance with its rivals and in meeting its goals {(Whittington 1980) and (Barnes 1987)}. The selection of ratios, however, is difficult and contentious due to the overlapping of information. If all the ratios were used, there would be redundancy, yet if only the completely independent ratio were used, not all information would be provided. The difficulty lies in finding those ratios (or categories of ratios) that present all relevant information, while minimizing duplication of data (Pinches et al. 1973).

Research has shown though that there are about 25 financial ratios that are relevant and useful to the construction industry {(Kanto and Martikainen 1992) and (Olinsky et al. 1996)}. Lev (1974) first divided these financial ratios into four categories

according to their conventional business interpretation: profitability ratios, liquidity ratios, financial leverage (long-term solvency) ratios, and efficiency ratios. Of these 25 ratios, 12 were found to be statistically most useful. The 12 ratios, three in each of (Lev 1974)'s categories, are as follows:

1. Profitability: return on assets, return on investments, earnings to sales.
2. Financial Leverage: debt to equity, debt to sales, equity to capital.
3. Liquidity: quick ratio, current ratio, and defensive interval.
4. Efficiency: inventory turnover, accounts receivable turnover, accounts payable turnover.

Using factor analysis on the above ratios and 'factor' categories, Kanto and Martikainen (1992) showed that each of the twelve ratios were highly correlated with each other, confirming their usefulness and accuracy.

Finally, three important points can be drawn from the thesis on financial ratios by Kanto and Martikainen (1992): first, the quick ratio appeared to outperform the other two ratios in terms of short-term solvency (Liquidity), indicating a higher degree of usefulness. The second point found in the thesis was that the financial leverage and efficiency ratio (Debt to Equity and Working Capital Turnover) categories were highly correlated with each other. The third and final point is that regarding the financial leverage ratios, the two strongest ratios were equity to capital and Debt to Equity. In summary, the findings of Kanto and Martikainen (1992) indicated that these twelve financial ratios are highly correlated and useful to decision makers.

4.6. Growth vs Value Strategy

When it comes to improving profit margins and boosting revenue growth, companies often devote substantial time and resources to innovate their products and processes. But the returns on these types of investment are inherently very risky. In today's competitive business environment, many firms are seeking ways to mitigate this risk while still attaining the revenue growth they desire, and many are turning to a more holistic approach: [strategic] business model innovation.

Teti et al. (2014) seeks to investigate the impact of a defined competitive strategy, either "differentiation" or "cost leadership", on the value created for the firm. These competitive strategy types are drawn from the foundational work by Porter (1985). Porter (1985) defines competitive strategy as "the search for a favorable competitive position in an industry, the fundamental arena in which competition occurs, and aims to establish a profitable and sustainable position against the forces that determine industry competition." Amit and Zott (2012) state, "Having an intentionally designed and structured business model is essential for firms to look beyond traditional innovative improvements and can lead to higher revenue growth and margins."

Businesses, both public and private, consistently face the dilemma of whether to adopt strategies to increase the value of a company (e.g. cost cutting via increased operational efficiencies, etc.) or to adopt strategies that contribute to the overall growth of the firm (e.g. entering new product type markets, vertical or horizontal acquisition or mergers, etc.).

Traditional research on the topic of value strategy has continually stressed the importance of extracting all that a firm can out of its resources, and erecting barriers to the outside competitive forces as a way to "capture value." These types of strategies suggest that to increase the profits of the firm, a firm needs to capture as much of the market share as possible, which is true, but to an extent. In contrast, some relatively newer research has focused on the concept of "value creation," which strives to improve the relative value of the firm's product from the customers' perspective in terms of increasing the customers' valuation of the product (Priem 2007). The results of a thesis by Aspara and Tikkanen (2013) indicate that a high emphasis on value creation strategies and low on the value capture strategies can be possible and perhaps improve the financial performance of both small and large firms alike. This research highlights the fact that value creation strategies, even in times of economic distress, can be a mechanism that small to midmarket size firms can implement in order to achieve improved levels of financial performance.

Second only to increased profits in the corporate sense, is firm growth. Growth is highly sought after by many firms in existence today. Yet Higgins (1977) highlights a fundamental point, which is that firm growth can be a two-edged sword if not properly evaluated, understood, and pursued. Higgins (1977) presented an idea of sustainable growth that is extremely valuable to any firm that might pursue higher growth strategies. Kim and Mauborgne (1997) present a powerful examination of the differences in those firms that are able to achieve high rates of firm growth versus those that cannot and what exactly drives this ability. In every case of a high growth company, its management

described what the authors termed as the "value innovation." These ‘high growth’ firm managers and leaders all saw the five dimensions of strategy: industry assumptions, strategic focus, customers, assets and capabilities, and product and service offerings in dynamic terms different from its competitors.

Upon this extensive review of literature from a variety of industries, it should appear obvious that strategic financial management is vital to the success, growth, and longevity of any business firm, construction firms included. In light of the ever-increasing competitiveness of the construction industry, having a defined set of goals and a strategy with which to follow to aid in reaching these goals is vitally important. The point of having defined and implemented growth, value, or focus financial strategies or a combination of them is repeatedly stated in almost all the above pieces of literature. The usefulness of this thesis can be summarized by the words of Eisenhardt and Martin (2000): "the organizational and strategic processes of firms are important because they facilitate the manipulation of resources into value-creating strategies." All of the literature supports the assumption that the presence of defined financial strategy has a profound direct and indirect impact on business growth, particularly in construction.

5. RESEARCH LIMITATIONS

To fill a gap in the construction literature, this research is intended to be broad in applicability, yet narrow in focus. This thesis examined the presence of a correlation between profitability (**GP** and **NIBT**) and the five presented financial ratios (**WCT**, **QR**, **D/E**, **ROA**, and **ROE**) useful in determining the current financial strength of a firm and in suggesting a basic financial strategy to pursue. Of the 870 participating firms in the *2016 Construction Financial Benchmarker* report compiled by the Construction Financial Management Association (CFMA), the thesis set is limited to those identified as "Construction Manager" or "General/Prime Contractor" to examine the correlation between profitability and the five financial ratios, narrowing the examined number of firms to 366.

Furthermore, the suggested strategies framework was created to best fit and suggest a strategic direction for those firms falling into the "Tier 2" segment (revenues between $51MM and $500MM {Table 1}). There were 189 firms in the *2016 Construction Financial Benchmarker* report that fit the "Tier 2" category and were used to validate the suggested framework.

Lastly, there are a score of various financial strategies that can be formulated to suit specific construction firms, and each variation of strategy can be slightly or drastically different to be most effective for each individual firm based on a plethora of factors from size, market, product type, financial strength, etc. Therefore, this thesis focused on two specific strategy types, growth and value, based upon the seminal strategic management work of Porter (1979). Each suggested strategy type consists of

two of the five elements that Porter (1979) presents, as well as one more construction specific strategic pursuit element found within the literature.

TABLE 6 Growth and Value Strategy Elements

Strategy Type	**Porter (1979) Elements**	**Specific Element**
Growth Strategy	"Differentiation" and "Cost Leadership"	"Internalization"
Value Strategy	"Focus" and "Cost Leadership"	"Product/ Market Diversification"

Source: Combination of Porter (1979) 5 generic strategies and Yee and Cheah (2006) strategies for construction firms.

6. RESEARCH METHODS

This thesis assessed the relationship between Gross Profit (**GP**) and Net Income Before Taxes (**NIBT**) and six useful financial metrics that are indicative of current financial position: Working Capital Turnover (**WCT**), Quick Ratio (**QR**), Debt/Equity ratio (**D/E**), Return on Assets (**ROA**), Return on Equity (**ROE**), and Firm Size (**S**).

The methodology of this thesis can be broken into two parts, with the first being the data collection and data analysis. During this phase of the thesis, published data from the *2016 Construction Financial Benchmarker* report as compiled by the Construction Financial Management Association (CFMA) was obtained with written permission. This collected data was then filtered from the 870 firms down to 366 firms by only examining those firms' financials that were classified as "Construction Manager" or "General/Prime Contractor." Next, upon extracting only those firms relevant to this thesis, the eight variables of interest (GP, NIBT, WCT, QR, D/E, ROA, ROE, and S) were extracted and/or calculated in order to examine the statistical correlation relationship between them. Figures 5 and 6 contain histograms showing the distributions of financial variables used. Finally, the statistical analysis was conducted, graphs and tables compiled, and results examined in order to draw conclusions.

The second part of the methodology for this thesis was the examination of financials for those firms classified as "Tier 2" firms (Table 1) of which there were 189 firms in this category. These firms' financial data was examined to accomplish a two-fold purpose. Part one of this financial examination was to examine whether a firm was financially ready or not, and to assist in the formulation of a framework which could be

used to offer pursuit suggestion of one of two basic financial strategy types found in the literature, Growth vs Value. Part two was to find and highlight firms that demonstrated a financial readiness to implement one of these two strategies, as well as firms ready to implement each of the two suggested basic strategy types (Figure 4). Figure 3 illustrates visually the framework that was compiled based on this financial data.

Limitations and assumptions were made to ensure the most accurate interpretation of the data collected and analyzed. These limitations are defined in Part 5: Research Limitations of this paper. A statistical consultant was also used to help ensure accurate interpretation of the statistical findings of this paper.

7. RESEARCH RESULTS

As the previous section noted, this thesis consisted of two parts. The first was the data collection and subsequent statistical analysis. The second was the presentation of a simple framework which firms can follow based on their current financial position, as indicated by the specified financial ratios, which suggests one of two basic financial strategies: Growth or Value.

7.1. Statistical Data Analysis

Originally this research analyzed and showed the relationship between five different financial measures: WCT, QR, D/E, ROA, and ROE, with two common profitability measures: GP and NIBT. The five financial ratios were selected for two reasons. The first reason was due to their relevance to the construction industry as well as their usefulness in measuring the current financial position of a firm, from which predictions and assumptions can also be made {(Pinches et al. 1973), (Barnes 1987), (Kanto and Martikainen 1992), and (Olinsky et al. 1996)}. The second was to determine which firms currently employed a clearly defined financial strategy and in doing so, spot the relationship between those firms with a defined strategy and their profitability metrics in order to demonstrate that those with defined financial strategies achieved higher levels of profit margin. Yet without having a direct method of determining those firms who currently employ a clear defined financial strategy, this thesis tried to use the specified ratios as a way to demonstrate this relationship.

The two profitability metrics, GP and NIBT, were selected for specific reasons as well. GP was used due to its commonality across many industries and is typically understood by the average reader. NIBT was used because it demonstrates a firm's ability to efficiently manage its overhead, which is vital in today's construction industry. Most construction firms do not self-perform more than 20% of the work on a project, but rather are simply process managers and managers of third-party subcontractors who perform the specific tasks required to construct a project. Therefore, the NIBT shows how efficiently a firm is managing these processes with regard to its overhead costs.

Each variable was selected based on frequency of appearance in related literature and on research demonstrating their usefulness {(Pinches et al. 1973), (Lev 1974), (Barnes 1987), (Kanto and Martikainen 1992), and (Olinsky et al. 1996)}; then each was calculated for all of the 366 firms chosen out of the *2016 Construction Financial Benchmarker*. Following the calculation of all variables, the Pearson correlations were conducted between Gross Profit and each of the five financial ratios along with firm size (**S**), as well as between Net Income before Taxes and each of the five in addition to firm size.

This relationship can be shown by calculating the Pearson correlation between variables. The Pearson correlation tells us both the strength and direction of these relationships. A correlation close to 1 indicates a strong positive relation; conversely, a correlation close to -1 indicates a strong negative relationship. A correlation close to 0 indicates that there is little to no relationship. In order to examine this potential

relationship, the Pearson correlation between all the variables (financial metrics) of interest was provided.

For the relationships explored, graphs of the data overlaid with a line of best fit found by ordinary linear regression (**OLS**) are provided. OLS is closely related to Pearson correlation; the R^2 goodness-of-fit measure for regression with one independent variable equivalent to the square of the Pearson correlation coefficient. Fitting a regression line lends more credibility to any measures of correlation provided. Note that the statistics software used was *R*©.

This thesis chair has repeatedly stated that a good sign of a thesis is when the findings are different from expectations. In this regard, the results were starkly different than what the thesis had anticipated. Upon statistical analysis, it was discovered that there was nearly no correlation between either GP and the selected variables or NIBT and the selected variables, which again was significantly different than expected. The anticipation of this thesis was that a linear relationship (Pearson Correlation approaching 1) would have been discovered and that the data points would have clustered along the OLS line of best fit. As is common among many data sets, there can be large outliers that can have a significant impact on regression and correlation results. The *2016 Construction Financial Benchmarker* data set was no different. In order to test the effect of these outliers, the thesis removed them and re-ran the tests. The results did not change significantly. Tables 7 and 8 summarize the observed statistical correlations between each of the variables of interest.

TABLE 7 Correlation between financial variables of interest and gross profit

	Gross Profit	Outliers Removed
Working Capital Turnover	−0.003	−0.046
Quick Ratio	0.002	−0.022
Debt Equity Ratio	0.042	N/A
Return on Assets	0.13	0.072
Return on Equity	0.13	0.083
Size	-0.18	N/A

TABLE 8 Correlation between financial variables of interest and gross profit

	Net Income before Taxes	Outliers Removed
Working Capital Turnover	-0.016	-0.07
Quick Ratio	0.083	N/A
Debt Equity Ratio	−0.021	N/A
Return on Assets	0.24	0.31
Return on Equity	0.27	0.28
Size	-0.16	N/A

As these tables show, the correlations with both outliers included and removed, there appears to be no significant correlation between GP and NIBT and the selected variables.

Upon reviewing the results of this analysis, it can be noted that the correlation between both GP and NIBT with WCT, QR, and D/E are nearly zero. A modest positive relationship was found between NIBT and ROA and ROE. But this was the only exception to the observed phenomenon. Figure 2 illustrates an example of a

clustering effect that was observed in nearly all of the tests that were run, but there was no apparent pattern to these clusters of which to mention.

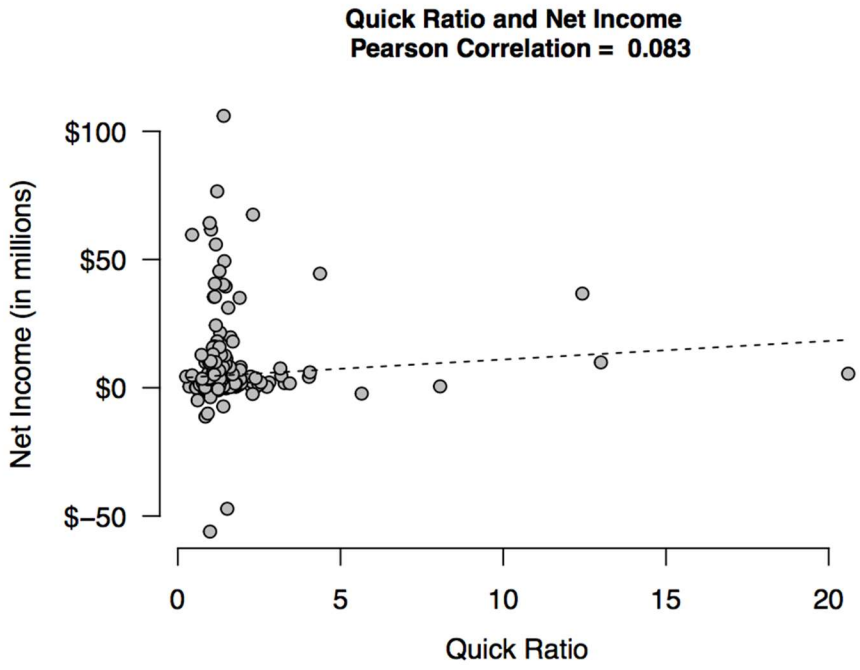


FIGURE 2 Pearson Correlation Test (Example)

This clustering can be seen in each test and observed in Appendix 1. Appendix 1 is purely a statistical description of the correlation tests for each of the described variables. Once again, these results were quite different from what the thesis had anticipated.

7.2. Strategy Framework

As previously stated, two of the primary goals of this research were to demonstrate the positive correlation between GP and NIBT with the five financial metrics, and also show the relationship between firm profitability (GP and NIBT) and the five chosen financial metrics, which in turn would demonstrate the relationship between profitability and the use of financial strategy. The five chosen financial metrics were chosen as an indirect way to try and observe which firms had a defined financial strategy and which did not. Yet as the statistical analysis showed, this indirect approach did not work.

Despite the lack of correlation discovered in the statistical analysis, the third stated primary goal of this research can still be accomplished. A simple framework that a firm can follow. Based on its current financial position as dictated by the presented financial metrics, this framework can offer suggestion of pursuit of either Growth strategy or Value strategy.

It is important to note that these strategies are a derivative form of the Growth and Value strategies commonly seen employed by those investing in the stock market. Using metonymic mapping, the thesis can apply these principles to the construction industry as a typology for financial strategies. In the case of common stock investments, Growth strategy consists of seeking out high growth companies and purchasing stock with that company in order to capitalize on that company's gains. Value strategy is about finding those companies that are undervalued but indicate an optimal future, purchasing their stock, and holding them until their value increases substantially. It should also be noted that these strategies presented are a basic strategic direction and can be

implemented in various ways specific to each individual firm. It should also be noted that this framework is only a basic framework with which to suggest a broad strategic outlook for those "Tier 2" firms based on the data collected and analyzed through the *2016 Construction Financial Benchmarker*, and is to be used as a baseline for strategic direction.

Each of the two following strategy types consist of two of the three previously mentioned generic strategic elements presented by Porter (1980). These are "(1) Cost Leadership- emphasizing cost reduction of its products and services; (2) Differentiation- offering the customer a special value by stressing quality, performance, or service; and (3) focus- targeting a selected segment of the market in terms of location, product, or group of customers." The two generic strategic elements are followed by one of either two, more specific strategic elements first presented by Yee and Cheah (2006).

To define these two strategy types in the context of construction financial strategy, Growth strategy is a strategy that incorporates three basic strategic elements, two of which are from Porter (1980). The first element is "Differentiation," the second "Cost Leadership," and the third "Internalization," which is the most specific of the three elements. Yee and Cheah (2006) define "Internalization" as "a means by which a firm seeks business expansion along the geographical dimension." This thesis add to this definition, "the method of expansion of firm capabilities through vertical or horizontal integration of construction processes in order to achieve higher levels of both efficiency and revenue, thus improving profit margin." The primary purpose of the Growth strategy is to assist above average financially strong firms to grow in size in terms of

contract revenue, scope, and financial capabilities. Value strategy also consists of three elements: two basic elements from Porter (1980): “Focus,” “Cost Leadership,” and the more specific strategy from Yee and Cheah (2006) is “Product/Market Diversification” strategy. “Product/Market Diversification” strategy is defined by (Yee and Cheah 2006) “as a means by which a firm expands from its core business into other product/service markets.” The primary goal of the Value strategy is to maximize the market share and the value of the company overall.

With these strategies having been defined in more detail, the framework outlined in Figure 3 can be explained. The goal of this framework is, based on a few key financial metrics, to suggest a financial strategy to pursue. The first step is to evaluate the firm’s profit margin, and compare it to the industry average to determine whether or not the firm is above average financially strong. The average profit margin (%) for the “Tier 2” firms from the *2016 Construction Financial Benchmarker* was 3.65%. Therefore, in the evaluation of the 189 “Tier 2” firms’ profit margins, this thesis chose 3.8% and up as ‘above average financially strong’ and thus good candidates to move forward in the selection of one of the two strategy types. If firms do not meet these criteria, the recommendation would be to delay implementation of either Growth or Value strategies, but rather lean more toward Porter (1980) generic ‘Focus’ strategy. This strategy is to direct a firm’s resources toward a specific market segment, project, or product type with the intent of establishing relationships, expertise, and economies of scope or scale to enable a firm to improve its current market and financial position.

If the firm does meet these criteria, then the next step is to inwardly evaluate the firm's risk tolerance. Growth strategies inherently expose a firm to more risk and thus require a higher risk tolerance as well as increased liquidity in order to successfully be able to implement them. The third step is to evaluate the firm's working capital turnover (WCT) rate. This step involves a little more gray area. Typically, a WCT greater than 30 indicates a need for more working capital and thus would point to a Growth strategy recommendation, yet strong financials, including higher liquidity (QR) and lower D/E ratios, are suggested in order to be able to absorb the increased risk exposure. On the other hand, there are plenty of examples where a firm has less than a 30, or even 15, WCT that have the financials that would suggest a Growth strategy simply due to their enjoyment of a strong financial position. The fourth step is to examine the firm's D/E ratio and QR. There are two scenarios within this framework that would suggest a pursuit of Growth strategy. The first is a firm with all of the above described criteria, plus a low D/E (Figure 4 uses a D/E less than 3.5) and a high QR (Figure 4 uses a QR greater than 1.35). The second is a higher D/E (Figure 4 uses greater than 3.5), is fairly liquid (Figure 4 uses QR between 1.0 and 1.35), but whose WCT is greater than 30, indicating a need for increased capital and ability to absorb the increased risk associated with this strategy type. If a specific firm meets the outlined criteria, then this framework would suggest pursuing a Growth strategy.

KEY:						
Growth Strategy Recommendation			Above Avg Profit %			
Value Strategy Recommendation						
Firm Code #	199	510	56	156	520	
REVENUE	$ 51,564,000.00	$ 60,835,100.00	$ 109,636,787.00	$ 81,906,000.00	$ 88,900,537.00	
GROSS PROFIT	$ 9,697,000.00	$ 9,210,476.00	$ 8,138,160.00	$ 6,772,000.00	$ 6,796,153.00	
NET INCOME (LOSS) before TAXES	$ 6,024,000.00	$ 3,624,849.00	$ 5,197,780.00	$ 3,769,000.00	$ 3,420,536.00	
NET INCOME LOSS	$ 6,024,000.00	$ 3,624,849.00	$ 5,197,780.00	$ 3,769,000.00	$ 3,402,076.00	
FIRM SIZE	115	260	93	173	47	
WORKING CAPITAL	$ 11,059,638.00	$ 2,519,596.00	$ 5,608,976.00	$ 2,598,000.00	$ 2,408,793.00	Tier 2 Firm Average
WORKING CAPITAL TURNOVER	4.662	24.145	19.547	31.527	36.907	20.075
QUICK RATIO	4.062	1.051	1.235	1.075	1.039	1.346
DEBT/EQUITY RATIO	0.176	1.408	4.074	8.046	7.084	3.947
PROFIT MARGIN (%)	11.68%	5.96%	4.74%	4.60%	3.83%	3.65%
RETURN ON ASSETS (%)	29.03%	8.36%	17.75%	17.10%	13.48%	10.32%
RETURN ON EQUITY (%)	34.13%	20.13%	90.10%	154.72%	108.96%	38.15%

FIGURE 4- Growth and Value Strategy Firm Examples

The second strategy option for those firms who do not enjoy a high liquid or lower leveraged position is a Value strategy. The firms best fit for this strategy type have relatively higher D/E ratios (Figure 4 uses D/E between 3.51 and 8.1), as well as lower liquidity (Figure 4 uses QR between 1.0 and 1.35). The described framework would suggest that firms that meet these specific criteria pursue a Value strategy. Those firms that do not meet any of the described criteria would perhaps benefit from the 'Focus' strategy as a means to improve their market presence and financial position.

8. CONCLUSION

This thesis set out to accomplish three things: first, to analyze the data from the *2016 Construction Financial Benchmarker* report in order to examine the correlation between two measures of profitability (GP and NIBT) and five useful financial metrics (WCT, QR, D/E, ROA, and ROE) as well as firm size (S), if any existed.

8.1 Study Conclusions

The *2016 Construction Financial Benchmarker* did not contain any survey question or method of observing which firms did or did not currently employ a defined financial strategy, and the author could not add this question on the survey prior to the completion of this thesis. Therefore, the primary reasoning for selecting these specific variables (WCT, QR, D/E, GP, and NIBT) was as a way to show the correlation between financial strategy and higher profitability by using financial metrics that are commonly relied upon by those firms employing some kind of defined financial strategy; however, upon thorough statistical analysis of the 366 firms classified as "Construction Manager" or "General/Prime Contractor," it was discovered that there was nearly no statistical correlation between these variables and profitability, as Tables 7 and 8 summarize. This does not mean that a positive correlation does not exist between firms employing a defined financial strategy and higher profitability, but rather that the indirect approach that the author attempted to use to show this relationship did not work. The usefulness of these financial metrics remains strong, as highlighted by the literature {(Kanto and

Martikainen 1992) and (Olinsky et al. 1996)}, but future research could pursue a more direct method of collecting those firms employing a defined financial strategy and thus more accurately explore the relationship between financial strategy and profitability.

The second task that this thesis accomplished, and was successful in doing so, was the creation of a simple framework which suggested pursuit of one of two basic strategy categories: Growth strategy and Value Strategy. Figure 4 illustrates this framework. The primary use for Growth strategy is to assist above average financially strong firms to grow in size in terms of contract revenue, scope, and financial capabilities. The primary use of the Value strategy is to maximize the market share and the value of the company overall. This framework simply tries to offer firms a way to examine their current financial position and bring to light a strategic aim that would perhaps benefit the firm moving forward. This framework also does not suggest complete abandonment of all other strategy types, for as Cho and Pucik (2005) stressed, balance in strategic approach is just as valuable as the strategy itself.

The main emphasis of this framework leads directly into the third task that this thesis accomplished which was to bring to the forefront the idea of defined financial strategy. After an extensive literature review, the third task was to fill an apparent gap in the construction literature specifically regarding financial strategy. The hope of this thesis is to bring increased attention to financial strategy within the construction industry.

8.2 Significance of Thesis and Future Research

As stated in the review of literature section, there has been significant research into strategic management. Particularly stemming from Porter's seminal book published in 1980. Not only has this research been found in businesses across an array of disciplines but specifically in the construction industry, example being: (Warszawski 1996). Yet again, there appears to be a gap in the literature pertaining to financial strategy in the construction industry. Recent articles have been published relating to large Tier 1 level construction firms, but none to this author's knowledge relating to "Tier 2" level firms. This thesis hopes to have fulfilled its three-fold purpose. Some potential uses and extensions of this thesis can be finding a more direct way to collect data on those firms that employ a defined financial strategy and those that do not, then analyze the relationship between those and their profitability ratios. The next step would be to compare them to determine if having a specifically defined financial strategy influences profitability levels. The author intends for this paper, with its relatively simple concepts and generalizations, to form the foundation of financial strategy in construction which further research can build upon. A cascade effect of this increased ability to take on new risks for higher rewards, as well as an increased openness to innovation and technologies, is that these innovations and tolerability to risks can potentially increase a firm's financial capabilities, further differentiating the company from its competitors, thus making it more competitive.

REFERENCES

(2012). "The Recession of 2007 - 2009." *BLS Spotlight on Statistics*, <http://www.bls.gov/spotlight/2012/recession/pdf/recession_bls_spotlight.pdf>. (October 06, 2016).

(2015). "Firm Characteristics Data Tables." *Business Dynamics Statistics*, <http://www.census.gov/ces/dataproducts/bds/data_firm.html>. (October 06, 2016).

Amaratunga, D., and Baldry, D. (2002). "Moving from performance measurement to performance management." *Facilities*, 20(5/6), 217-223.

Amit, R., and Zott, C. (2012). "Creating value through business model innovation." *MIT Sloan Management Review*, 53(3), 41.

Antzoulatos, A. A., Koufopoulos, K., Lambrinoudakis, C., and Tsiritakis, E. (2016). "Supply of capital and capital structure: The role of financial development." *Journal of Corporate Finance*, 38, 166-195.

Aspara, J., and Tikkanen, H. (2013). "Creating novel consumer value vs. capturing value: Strategic emphases and financial performance implications." *Journal of Business Research*, 66(5), 593-602.

Barnes, P. (1987). "The analysis and use of financial ratios: A review article." *Journal of Business Finance & Accounting*, 14(4), 449-461.

Barton, S. L., and Gordon, P. I. (1987). "Corporate strategy: useful perspective for the thesis of capital structure?" *Academy of Management Review*, 12(1), 67-75.

Beckers, R., van der Voordt, T., and Dewulf, G. (2015). "Aligning corporate real estate with the corporate strategies of higher education institutions." *Facilities*, 33(13/14), 775-793.

Betz, F. (2002). "Strategic business models." *Engineering management journal*, 14(1), 21-28.

Carpenter, R. E., and Petersen, B. C. (2002). "Is the growth of small firms constrained by internal finance?" *The Review of economics and Statistics*, 84(2), 298-309.

Chan, T. K. (2009). "Measuring performance of the Malaysian construction industry." *Construction Management and Economics*, 27(12), 1231-1244.

Cheah, C. Y., and Garvin, M. J. (2004). "An open framework for corporate strategy in construction." *Engineering, Construction and Architectural Management*, 11(3), 176-188.

Cheah, C. Y., Garvin, M. J., and Miller, J. B. (2004). "Empirical thesis of strategic performance of global construction firms." *Journal of construction engineering and management*, 130(6), 808-817.

Cheah, C. Y., Kang, J., and Chew, D. A. (2007). "Strategic analysis of large local construction firms in China." *Construction Management and Economics*, 25(1), 25-38.

Cheah, Y. J. (2002). "Fundamental analysis and conceptual model for corporate strategy in global engineering and construction markets." Massachusetts Institute of Technology.

Chinowsky, P. S., and Meredith, J. E. (2000). "Strategic management in construction." *Journal of Construction Engineering and Management*, 126(1), 1-9.

Cho, H. J., and Pucik, V. (2005). "Relationship between innovativeness, quality, growth, profitability, and market value." *Strategic management journal*, 26(6), 555-575.

Christensen, C. M., Johnson, M. W., and Rigby, D. K. (2002). "Foundations for growth: How to identify and build disruptive new businesses." *MIT Sloan Management Review*, 43(3), 22.

Collis, D. J., and Montgomery, C. A. (1995). "Competing on Resources: Strategy in the 1990s."

De Wit, B., and Meyer, R. (1998). "Strategy: Process, Content." *Context*, 5.

Dierickx, I., and Cool, K. (1989). "Asset stock accumulation and sustainability of competitive advantage." *Management science*, 35(12), 1504-1511.

Eisenhardt, K. M., and Martin, J. A. (2000). "Dynamic capabilities: what are they?" *Strategic management journal*, 1105-1121.

Ercan, T., and Koksal, A. "The effect of competitive and growth strategy type on financial strategies in construction companies." *Proc., International Conference on Construction and Real Estate Management (ICCREM 2013), ISBN-13*, 10-11.

Ghemawat, P. (2002). "Competition and business strategy in historical perspective." *Business history review*, 76(01), 37-74.

Gluck, F. W. (1985). "A fresh look at strategic management." *Journal of Business Strategy*, 6(2), 4-19.

Hamel, G., Doz, Y. L., and Prahalad, C. K. (1989). "Collaborate with your competitors and win." *Harvard business review*, 67(1), 133-139.

Hawas, F., and Cifuentes, A. (2014). "Valuation of projects with stochastic cash flows and intertemporal correlations: practical modeling guidelines." *Journal of Construction Engineering and Management*, 140(6), 06014003.

Higgins, R. C. (1977). "How much growth can a firm afford?" *Financial management*, 7-16.

Johnson, G., Scholes, K., and Whittington, R. (2008). *Exploring corporate strategy: text & cases*, Pearson Education.

Kale, S., and Arditi, D. (2002). "Competitive positioning in United States construction industry." *Journal of construction engineering and management*, 128(3), 238-247.

Kanto, A. J., and Martikainen, T. (1992). "A test on a priori financial characteristics of the firm." *European journal of operational research*, 57(1), 13-23.

Kazaz, A., and Ulubeyli, S. (2009). "Strategic management practices in Turkish construction firms." *Journal of Management in Engineering*, 25(4), 185-194.

Kim, C. W., and Mauborgne, R. (1997). "Value innovation: The strategic logic of high growth." *Harvard business review*, 75, 103-112.

Krumm, P. J., Dewulf, G., and De Jonge, H. (1998). "Managing key resources and capabilities: pinpointing the added value of corporate real estate management." *Facilities*, 16(12/13), 372-379.

Lenz, R. T. (1980). "Strategic capability: A concept and framework for analysis." *Academy of Management Review*, 5(2), 225-234.

Lev, B. (1974). "On the association between operating leverage and risk." *Journal of financial and quantitative analysis*, 9(4), 627-641.

Low, P. Y., and Chen, K. H. (2004). "Diversification and capital structure: Some international evidence." *Review of Quantitative Finance and Accounting*, 23(1), 55-71.

Lussier, R. N., and Pfeifer, S. (2001). "A crossnational prediction model for business success." *Journal of Small Business Management*, 39(3), 228-239.

Mayo, M. C., and Brown, G. S. (1999). "Strategic Planning: The Business Model: Relied upon for years, the traditional business model is on shaky ground." *Ivey Business Journal*, 63, 18-23.

Morris, M., Schindehutte, M., and Allen, J. (2005). "The entrepreneur's business model: toward a unified perspective." *Journal of business research*, 58(6), 726-735.

Nourse, H., and Roulac, S. (1993). "Linking real estate decisions to corporate strategy." *Journal of real estate research*.

Olinsky, A., Harlow, L., and Chen, S. "A priori classification of financial ratios by the method of confirmatory factor analysis." *Proc., Proceedings-Annual Meeting of the Decision Sciences Institute*, 1161-1163.

Ozorhon, B., Oral, K., and Demirkesen, S. (2015). "Investigating the Components of Innovation in Construction Projects." *Journal of Management in Engineering*, 32(3), 04015052.

Pinches, G. E., Mingo, K. A., and Caruthers, J. K. (1973). "The stability of financial patterns in industrial organizations." *The Journal of Finance*, 28(2), 389-396.

Porter, M. E. (1979). "How competitive forces shape strategy." *Harvard business review*.

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industry and competitors*.

Porter, M. E. (1981). "The contributions of industrial organization to strategic management." *Academy of management review*, 6(4), 609-620.

Porter, M. E. (1985). "Technology and competitive advantage." *Journal of business strategy*, 5(3), 60-78.

Price, A. D., and Newson, E. (2003). "Strategic management: Consideration of paradoxes, processes, and associated concepts as applied to construction." *Journal of management in engineering*, 19(4), 183-192.

Priem, R. L. (2007). "A consumer perspective on value creation." *Academy of Management Review*, 32(1), 219-235.

Quader, S. M. (2017). "Differential effect of liquidity constraints on firm growth." *Review of Financial Economics*, 32, 20-29.

Raudszus, M., Schiereck, D., and Trillig, J. (2014). "Does vertical diversification create superior value? Evidence from the construction industry." *Review of Managerial Science*, 8(3), 293-325.

Roulac, S. (2001). "Corporate property strategy is integral to corporate business strategy." *Journal of Real Estate Research*.

Slaughter, E. S. (2000). "Implementation of construction innovations." *Building research & information*, 28(1), 2-17.

Slywotzky, A. J. (1996). *Value migration: how to think several moves ahead of the competition*, Harvard Business Press.

Stalk, G., Evans, P., and Shulman, L. E. (1991). "Competing on capabilities: the new rules of corporate strategy." *Harvard business review*, 70(2), 57-69.

Stewart, D. W., and Zhao, Q. (2000). "Internet marketing, business models, and public policy." *Journal of Public Policy & Marketing*, 19(2), 287-296.

Teti, E., Perrini, F., and Tirapelle, L. (2014). "Competitive strategies and value creation: A twofold perspective analysis." *Journal of Management Development*, 33(10), 949-976.

Tucker, M., and Pitt, M. (2009). "Customer performance measurement in facilities management: a strategic approach." *International Journal of Productivity and Performance Management*, 58(5), 407-422.

Venegas, C. P., and Alarcón, C. L. F. (1997). "Selecting long-term strategies for construction firms." *Journal of Construction Engineering and Management*, 123(4), 388-398.

Warszawski, A. (1996). "Strategic planning in construction companies." *Journal of construction engineering and management*, 122(2), 133-140.

Wenhua, L. (2013). "Thesis on the Financial Risks of Real Estate Enterprise."

Whittington, G. (1980). "Some basic properties of accounting ratios." *Journal of Business Finance & Accounting*, 7(2), 219-232.

Yee, C. Y., and Cheah, C. Y. (2006). "Interactions between business and financial strategies of large engineering and construction firms." *Journal of Management in Engineering*, 22(3), 148-155.

APPENDIX 1 - TABLES

TABLE 1 Segmentation of Firm Size by Annual Revenue

Tier 3 Firm	**Tier 2 Firm**	**Tier 1 Firm**
Annual Revenue < $50 MM	Annual Revenue $51MM < AR < $500MM	Annual Revenue > $500MM

TABLE 2

Fundamental Journal Papers Part 1			
Number	Citation	No. of Citations	Journal Published
1	Porter, M. E. (1979). "How competitive forces shape strategy."	4,131	Harvard Business Review
2	Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industry and competitors*.	43,058	Published by Free Press in 1980
3	Stalk, G., Evans, P., and Shulman, L. E. (1991). "Competing on capabilities: the new rules of corporate strategy." *Harvard business review*, 70(2), 57-69.	2,970	Harvard Business Review
4	Warszawski, A. (1996). "Strategic planning in construction companies." *Journal of construction engineering and management*, 122(2), 133-140.	166	Journal of Construction Engineering and Management
5	Venegas C, P., and Alarcón C, L. F. (1997). "Selecting long-term strategies for construction firms." *Journal of Construction Engineering and Management*, 123(4), 388-398.	81	Journal of Construction Engineering and Management
6	Cheah, C. Y., Garvin, M. J., and Miller, J. B. (2004). "Empirical study of strategic performance of global construction firms." *Journal of construction engineering and management*, 130(6), 808-817.	75	Journal of Construction Engineering and Management
7	Low, P. Y., and Chen, K. H. (2004). "Diversification and capital structure: Some international evidence." Review of Quantitative Finance and Accounting, 23(1), 55-71.	80	Review of Quantitiative Finance and Accounting

TABLE 3

Fundamental Journal Papers Part 2			
Number	Citation	No. of Citations	Journal Published
8	Ercan, T., and Koksal, A. "The effect of competitive and growth strategy type on financial strategies in construction companies." *Proc., International Conference on Construction and Real Estate Management (ICCREM 2013), ISBN-13* , 10-11.	2	International Conference on Constrution and Real Estate Management Proceedings-ASCE-
9	Yee, C. Y., and Cheah, C. Y. (2006). "Interactions between business and financial strategies of large engineering and construction firms." Journal of Management in Engineering, 22(3), 148-155.	26	Journal of Management in Engineering-ASCE-
10	Kanto, A. J., & Martikainen, T. (1992). A test on a priori financial characteristics of the firm. European journal of operational research, 57(1), 13-23.	15	European Journal of operational research
11	Öcal, M. E., Oral, E. L., Erdis, E., & Vural, G. (2007). Industry financial ratios—application of factor analysis in Turkish construction industry. Building and Environment, 42(1), 385-392.	85	Building and Environment
12	Higgins, R. C. (1977). How much growth can a firm afford?. Financial management, 7-16.	349	Financial Management
13	Aspara, J., & Tikkanen, H. (2013). Creating novel consumer value vs. capturing value: Strategic emphases and financial performance implications. Journal of Business Research, 66(5), 593-602.	20	Journal of Business Research

TABLE 4

Search Engines Utilized

1	ASCE Library
2	Elsevier
3	Emerald Insight
4	Google
5	Google Scholars
6	Research Gate
7	Taylor & Francis Online

TABLE 5

Keywords Used

1	Competition	61	Competitivity	121	Risk-return profile
2	Financial Factors	62	Business Strategy	122	Competitve forces
3	Construction companies	63	Capabilities-Based Competitio	123	Business competition
4	strategic planning	64	Accounting	124	Management
5	competitive advantage	65	Competence	125	Stratgegic planning
6	construction enterprises	66	Competitiveness	126	Innovations
7	Project Valuation	67	Project management	127	Higher education institutions
8	Net Present Value	68	Strategic management	128	Corporate finance
9	Internal Rate of Return	69	Strategic planning definition	129	Real estate Value analysis
10	Stochastic cash-flow	70	Statistical analysis	130	Stakeholders
11	Management Methods	71	Hazards Management	131	Social Responsibility of Business
12	Strategic Analysis	72	Quality assurance	132	Core competencies
13	Organization Management	73	Risk Assessment	133	Entrepreneurship
14	Investments	74	Time duration	134	Stockholder wealth
15	Joint Ventures	75	Real Estate Properties	135	Sustainable growth
16	Product Diversification	76	Commercial Real Estate	136	Business structures
17	Financial Leverage	77	Project Life Cycles	137	Payout ratios
18	Capital Structure	78	Engineering Firm	138	Sales growth
19	Competitive Forces	79	Risk Management	139	Dividends
20	Decision Making	80	Business Management	140	Debt to equity ratio
21	Business models	81	Financial industry analysis	141	Leverage effect
22	Management Science	82	Financial ratios	142	Equity
23	Computer Industry	83	Turkish economy	143	Depreciation
24	Electronics Industry	84	Factor analysis	144	Economic inflation
25	Strategic Planning	85	Benchmarking	145	Law of proportionate effects
26	Growth	86	Performance evaluation	146	Consumer value
27	SME	87	Data envelopment analysis	147	Strategy innovation
28	Entrepreneurial orientation	88	Composite indicators		
29	Attitude	89	Financial measurement		
30	Environment	90	Planning		
31	Resources	91	Company characteristics		
32	Construction Industry	92	Construction sector		
33	Building Contracting firm	93	Financial performance		
34	Methodology	94	Management practices		
35	Competivity	95	Small business		
36	Resource Management	96	Owner-manager characteristics		
37	Strategy	97	Activity sets		
38	Financial Factors	98	Architecture		
39		99	Business model		
40		100	Life cylces		
41	Construction Companies	101	Upper management		
42	Financial Strategy	102	Organizational change		
43	Operations Management	103	Business plans		
44	Corporate Strategy	104	Performance measurement (quality)		
45	Business Strategy	105	Customer satisfaction		
46	Business Capabilities	106	Benchmarking		
47	Capabilties-Based Competitior	107	Alignment		
48	Construction Projects	108	Corporate real estate management		
49	Construction Management	109	Espoused strategy		
50	Innovation	110	Model dynamics		
51	Performance Measurement	111	Strategy in-use		
52	Valuation	112	Real estate		
53	Net Present Value	113	Added value		
54	Internal Rate of Return	114	Value Creation		
55	Quantitative methods	115	value capture		
56	Convergence	116	profitable growth		
57	Financial Constraints	117	market value		
58	Financial Development	118	Growth cash flow sensitivity		
59	Diversification	119	Research & development		
60	Merger & Acquisisiton	120	Growth industries		

TABLE 6 Growth and Value Strategy Elements

Strategy Type	**Porter (1979)'s Elements**	**Specific Element**
Growth Strategy	"Differentiation" and "Cost Leadership"	"Internalization"
Value Strategy	"Focus" and "Cost Leadership"	"Product/ Market Diversification"

Source: Combination of Porter (1979) 5 generic strategies and Yee and Cheah (2006) strategies for construction firms.

TABLE 7 Summary of Correlation for GP with Variables of Interest

	Gross Profit	**Outliers Removed**
Working Capital Turnover	−0.003	−0.046
Quick Ratio	0.002	−0.022
Debt Equity Ratio	0.042	N/A
Return on Assets	0.13	0.072
Return on Equity	0.13	0.083
Size	-0.18	N/A

TABLE 8 Summary of Correlation for NIBT with Variables of Interest

	Net Income before Taxes	Outliers Removed
Working Capital Turnover	-0.016	-0.07
Quick Ratio	0.083	N/A
Debt Equity Ratio	−0.021	N/A
Return on Assets	0.24	0.31
Return on Equity	0.27	0.28
Size	-0.16	N/A

TABLE 9 Structured Literature Search Iterations

Structured Literature Search Category	# of Papers Studied in Thesis Totals	# of Papers Studied in Thesis Per Section
Bibliography	100	-
References	65	-
Strategic Management in Business	-	12
Strategic Management in Construction	-	9
Financial Strategy in Business	-	8
Financial Strategy in Construction	-	6
Financial Metrics	-	3
Growth vs Value Strategy	-	10

APPENDIX 2 - FIGURES

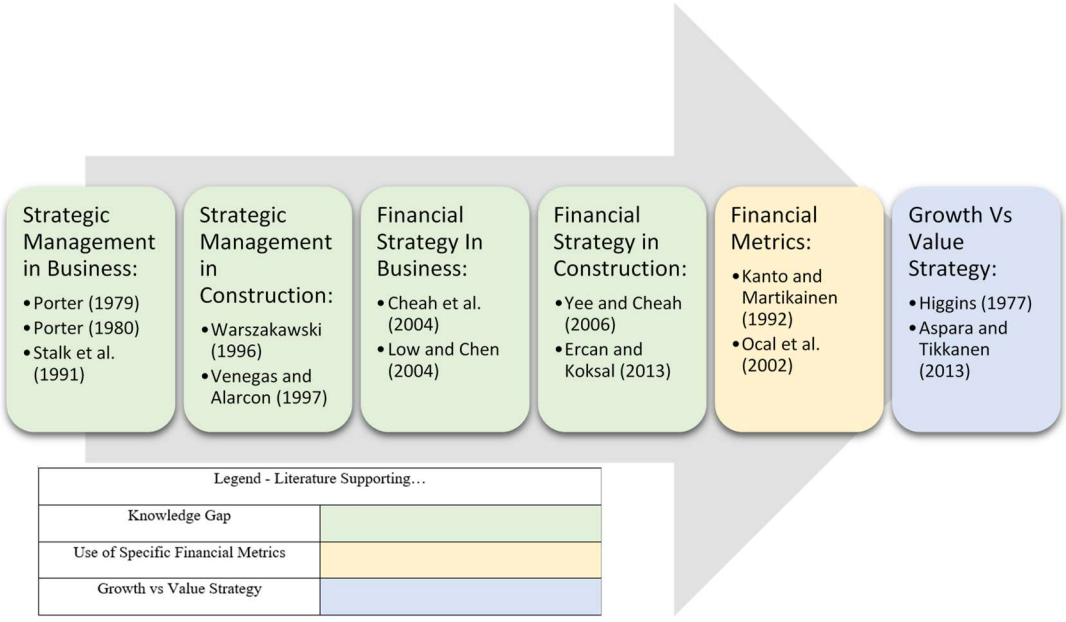


FIGURE 1 - Flow of Seminal Literature Publications

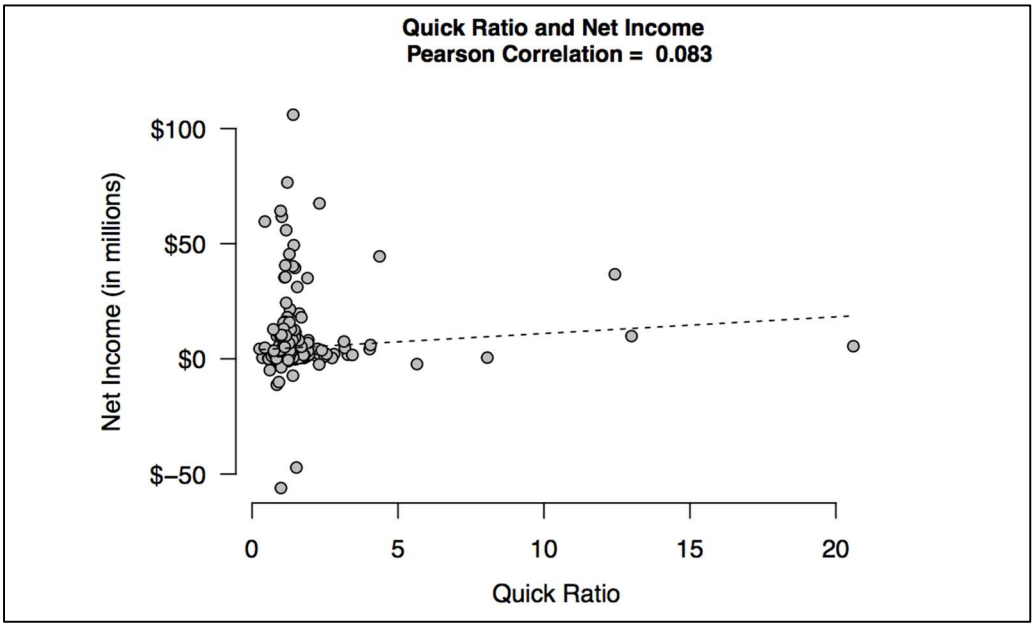


FIGURE 2- Pearson Correlation Test (Example)

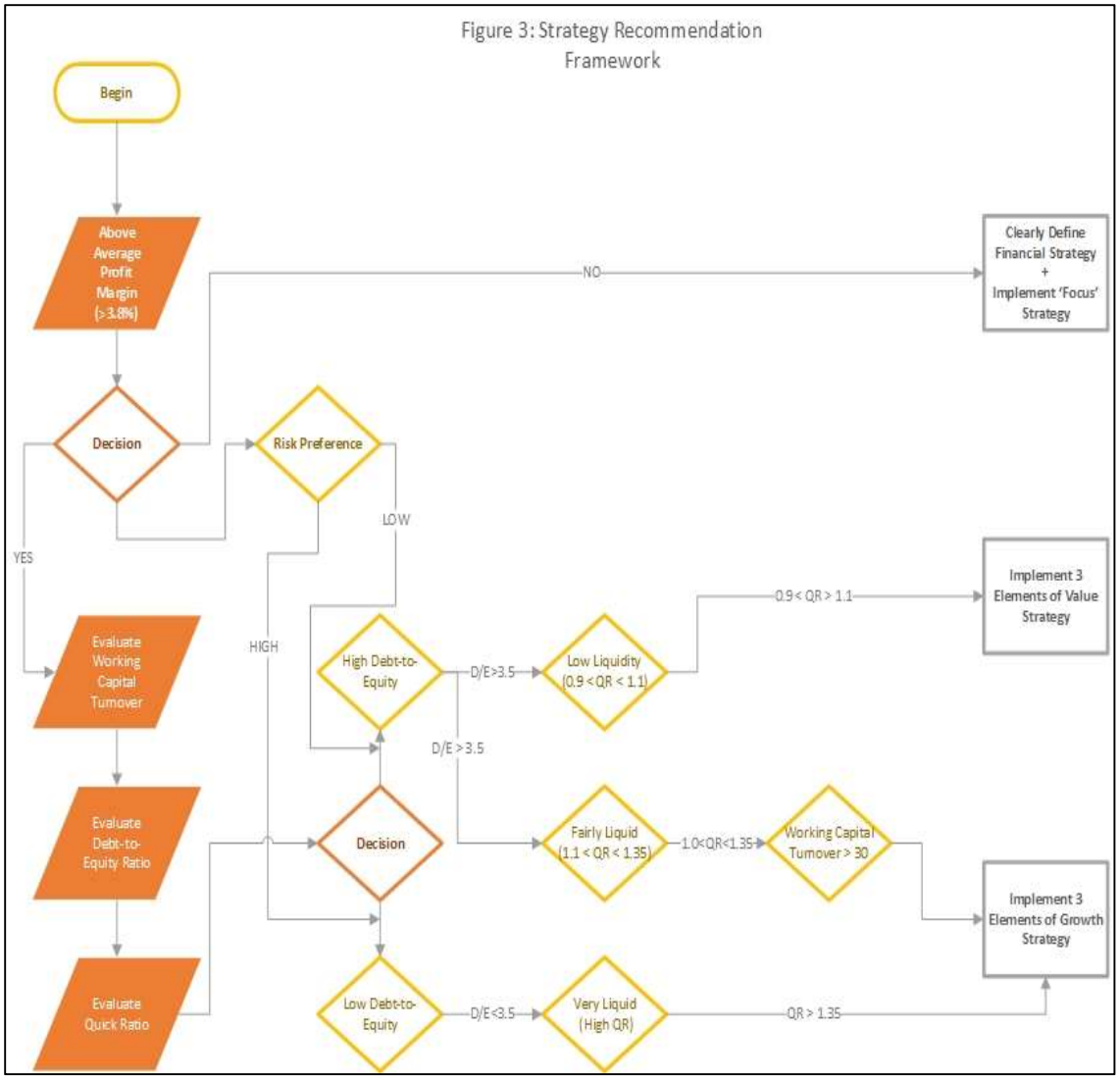


FIGURE 3- Financial Strategy Recommendation Framework

KEY:	
Growth Strategy Recommendation	Above Avg Profit %
Value Strategy Recommendation	

Firm Code #	199	510	56	156	520	
REVENUE	$ 51,564,000.00	$ 60,835,100.00	$ 109,636,787.00	$ 81,906,000.00	$ 88,900,537.00	
GROSS PROFIT	$ 9,697,000.00	$ 9,210,476.00	$ 8,138,160.00	$ 6,772,000.00	$ 6,796,153.00	
NET INCOME (LOSS) before TAXES	$ 6,024,000.00	$ 3,624,849.00	$ 5,197,780.00	$ 3,769,000.00	$ 3,420,536.00	
NET INCOME LOSS	$ 6,024,000.00	$ 3,624,849.00	$ 5,197,780.00	$ 3,769,000.00	$ 3,402,076.00	
FIRM SIZE	115	260	93	173	47	
WORKING CAPITAL	$ 11,059,638.00	$ 2,519,596.00	$ 5,608,976.00	$ 2,598,000.00	$ 2,408,793.00	Tier 2 Firm Average
WORKING CAPITAL TURNOVER	4.662	24.145	19.547	31.527	36.907	20.075
QUICK RATIO	4.062	1.051	1.235	1.075	1.039	1.346
DEBT/EQUITY RATIO	0.176	1.408	4.074	8.046	7.084	3.947
PROFIT MARGIN (%)	11.68%	5.96%	4.74%	4.60%	3.83%	3.65%
RETURN ON ASSETS (%)	29.03%	8.36%	17.75%	17.10%	13.48%	10.32%
RETURN ON EQUITY (%)	34.13%	20.13%	90.10%	154.72%	108.96%	38.15%

FIGURE 4- Growth and Value Strategy Firm Examples

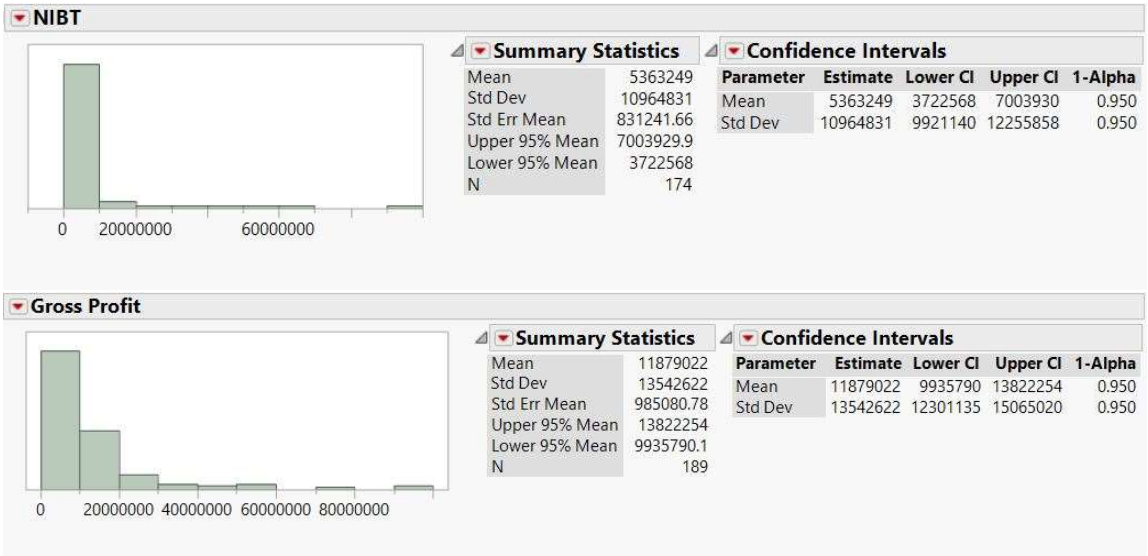
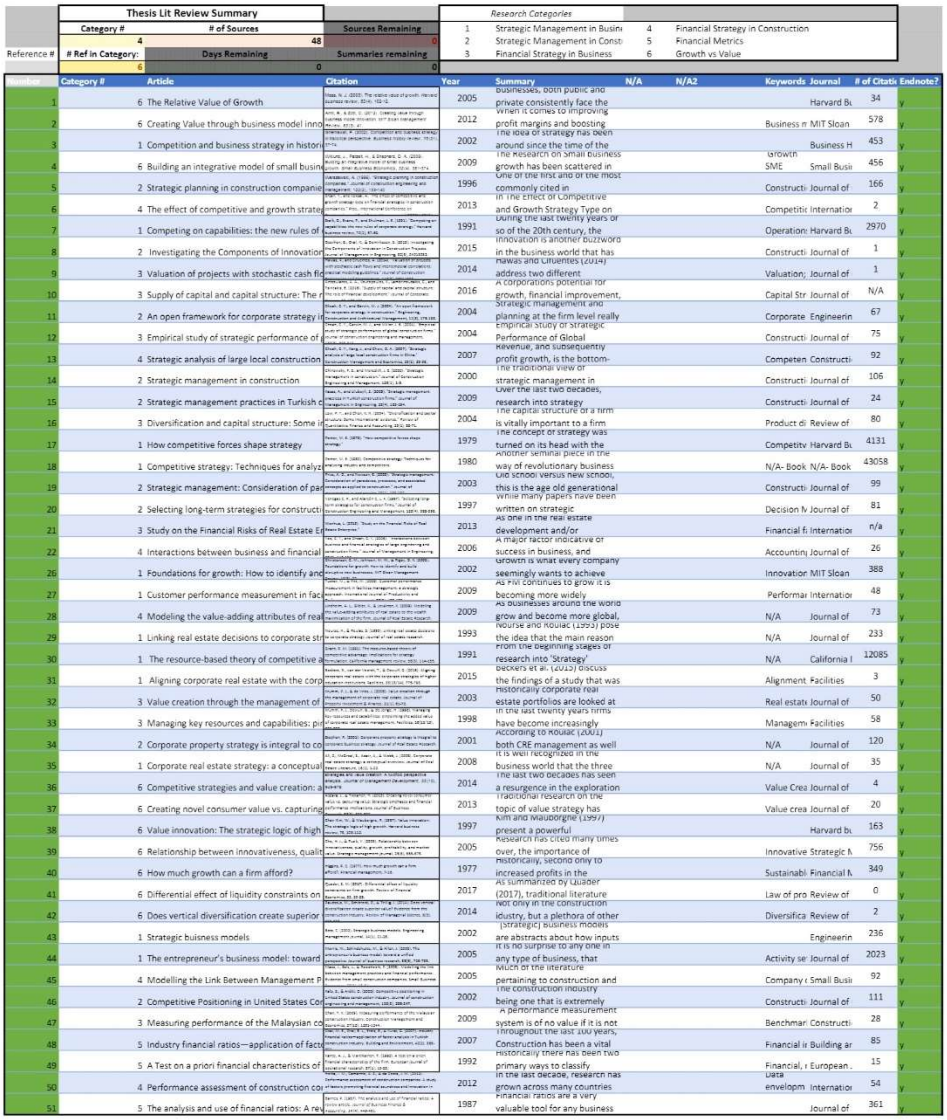


FIGURE 5 – Profitability Distributions

FIGURE 6 – Financial Ratio Distributions

APPENDIX 3 – LITERATURE REVIEW EXCEL PROCESS



Thesis Lit Review Summary			
Category #	# of Sources	Sources Remaining	
4	48	0	
Reference #	# Ref in Category:	Days Remaining	Summaries remaining
6	0	0	

Research Categories			
1	Strategic Management in Busin	4	Financial Strategy in Construction
2	Strategic Management in Const	5	Financial Metrics
3	Financial Strategy in Business	6	Growth vs Value

Number	Category #	Article	Citation	Year	Summary	N/A	N/A2	Keywords	Journal	# of Citatic	Endnote?
1	6	The Relative Value of Growth		2005	businesses, both public and private consistently face the				Harvard Bu	34	y
2	6	Creating Value through business model inno		2012	When it comes to improving profit margins and boosting			Business m	MIT Sloan	578	y
3	1	Competition and business strategy in histor		2002	The idea of strategy has been around since the time of the				Business H	453	y
4	6	Building an integrative model of small busin		2009	The research on Small business growth has been scattered in			Growth SME	Small Busi	456	y
5	2	Strategic planning in construction companie		1996	One of the first and of the most commonly cited in			Constructi	Journal of	166	y
6	4	The effect of competitive and growth strate		2013	In The Effect of Competitive and Growth Strategy Type on			Competitic	Internatio	2	y
7	1	Competing on capabilities: the new rules of		1991	During the last twenty years or so of the 20th century, the			Operation	Harvard Bu	2970	y
8	2	Investigating the Components of Innovation		2015	Innovation is another buzzword in the business world that has			Constructi	Journal of	1	y
9	3	Valuation of projects with stochastic cash flo		2014	Nawas and Ghuleites (2014) address two different			Valuation;	Journal of	1	y
10	3	Supply of capital and capital structure: The r		2016	A corporation's potential for growth, financial improvement,			Capital Str	Journal of	N/A	y
11	2	An open framework for corporate strategy in		2004	Strategic management and planning at the firm level really			Corporate	Engineerin	67	y
12	3	Empirical study of strategic performance of		2004	Empirical Study of Strategic Performance of Global			Constructi	Journal of	75	y
13	4	Strategic analysis of large local construction		2007	Revenue, and subsequently profit growth, is the bottom-			Competen	Constructi	92	y
14	2	Strategic management in construction		2000	The traditional view of strategic management in			Constructi	Journal of	106	y
15	2	Strategic management practices in Turkish c		2009	Over the last two decades, research into strategy			Constructi	Journal of	24	y
16	3	Diversification and capital structure: Some ir		2004	The capital structure of a firm is vitally important to a firm			Product di	Review of	80	y
17	1	How competitive forces shape strategy		1979	The concept of strategy was turned on its head with the			Competitiv	Harvard Bu	4131	y
18	1	Competitive strategy: Techniques for analyz		1980	Another seminal piece in the way of revolutionary business			N/A- Book	N/A- Book	43058	y
19	2	Strategic management: Consideration of par		2003	Old school versus new school, this is the age old generational			Constructi	Journal of	99	y
20	2	Selecting long-term strategies for construct		1997	While many papers have been written on strategic			Decision M	Journal of	81	y
21	3	Study on the Financial Risks of Real Estate E		2013	As one in the real estate development and/or			Financial ri	Internatio	n/a	y
22	4	Interactions between business and financial		2006	A major factor indicative of success in business, and			Accountin	Journal of	26	y
26	1	Foundations for growth: How to identify and		2002	Growth is what every company seemingly wants to achieve			Innovation	MIT Sloan	388	y
27	1	Customer performance measurement in fac		2009	As PM continues to grow it is becoming more widely			Performar	Internatio	48	y
28	4	Modeling the value-adding attributes of rea		2009	As businesses around the world grow and become more global,			N/A	Journal of	73	y
29	1	Linking real estate decisions to corporate str		1993	Nourse and Roulac (1993) pose the idea that the main reason			N/A	Journal of	233	y
30	1	The resource-based theory of competitive a		1991	From the beginning stages of research into 'Strategy'			N/A	California I	12085	y
31	1	Aligning corporate real estate with the corp		2015	Beckers et al. (2013) discuss the findings of a study that was			Alignment	Facilities	3	y
32	3	Value creation through the management of		2003	Historically corporate real estate portfolios are looked at			Real estate	Journal of	50	y
33	3	Managing key resources and capabilities: pir		1998	In the last twenty years firms have become increasingly			Managem	Facilities	58	y
34	2	Corporate property strategy is integral to co		2001	According to Roulac (2001) both CRE management as well			N/A	Journal of	120	y
35	1	Corporate real estate strategy: a conceptual		2008	It is well recognized in the business world that the three			N/A	Journal of	35	y
36	6	Competitive strategies and value creation: a		2014	The last two decades has seen a resurgence in the exploration			Value Crea	Journal of	4	y
37	6	Creating novel consumer value vs. capturing		2013	Traditional research on the topic of value strategy has			Value crea	Journal of	20	y
38	6	Value innovation: The strategic logic of high		1997	Kim and Mauborgne (1997) present a powerful				Harvard bu	163	y
39	6	Relationship between innovativeness, qualit		2005	Research has cited many times over, the importance of			Innovative	Strategic M	756	y
40	6	How much growth can a firm afford?		1977	Historically, second only to increased profits in the			Sustainabl	Financial M	349	y
41	6	Differential effect of liquidity constraints on		2017	As summarized by Quader (2017), traditional literature			Law of pro	Review of	0	y
42	6	Does vertical diversification create superior		2014	Not only in the construction industry, but a plethora of other			Diversifica	Review of	2	y
43	1	Strategic buisness models		2002	(strategic) business models are abstracts about how inputs				Engineerin	236	y
44	1	The entrepreneur's business model: toward		2005	It is no surprise to any one in any type of business, that			Activity se	Journal of	2023	y
45	4	Modelling the Link Between Management P		2005	Much of the literature pertaining to construction and			Company (	Small Busi	92	y
46	2	Competitive Positioning in United States Co		2002	The construction industry being one that is extremely			Constructi	Journal of	111	y
47	3	Measuring performance of the Malaysian co		2009	A performance measurement system is of no value if it is not			Benchmar	Constructi	28	y
48	5	Industry financial ratios—application of facto		2007	Throughout the last 100 years, Construction has been a vital			Financial ir	Building ar	85	y
49	5	A Test on a priori financial characteristics of		1992	historically there has been two primary ways to classify			Financial, r	European	15	y
50	4	Performance assessment of construction co		2012	In the last decade, research has grown across many countries			Data envelopm	Internatio	54	y
51	5	The analysis and use of financial ratios: A rev		1987	Financial ratios are a very valuable tool for any business				Journal of	361	y

APPENDIX 4 - EXTENDED LITERATURE REVIEW

Section 1: Strategic Management in Business

The idea of strategy has been around since the time of the ancient Greeks, and was always referred to in terms of military strategy. Ghemawat (2002) addresses the fact that strategy in terms of business has only been around since the twentieth century. Two early events discussed in (Ghemawat 2002) work helped to bring strategy to the forefront of business thought. The scope and opportunity for strategy as a method to actively try and control the competitive environment and the forces at play in that market began really to become clearer in the latter half of the nineteenth century as (Ghemawat) notes, with the development of railroads which presented for the first time, Mass markets. This enabled firms to access higher levels of capital and could achieve greater economies of scale. The second event was World War II, which brought about many innovations and breakthroughs in strategic management thinking as the entire war-time economy had to deal with the allocation of scarce resources to produce the goods the customers needed. The aim of (Ghemawat)'s research is purely to provide historical context for these theories to enable firms to more clearly understand the concept of strategy and the development of strategic theory in business management.

The concept of strategy was turned on its head with the introduction of Michael Porters paper in 1979 on how competitive forces shape strategy. (Porter 1979) introduces five forces that dictate industry competition and thereby strategy formulation. Porter poses that the executive management’s goal should be to identify the firm’s strength, and position itself where it can best defend itself against these forces. Based on these

identified factors, management can develop a strategic course of action that positions the company to best defend itself from the identified competitive forces, influences the balance of these forces to the firms favor, and is directed towards anticipating any shifts in these forces so as to enable the firm to exploit these shifts to its advantage. From the beginning stages of research into 'Strategy' beginning with (Porter)'s thesis of industries and the competitive forces at work on them, the primary focus has been on only one part of Strategy, the connection between strategy and the external environment. The second part, the firm's internal processes, was not explored until years later. The key to strategic management in today's business environment is developing dynamic strategy that can exploit changes in the competitive forces, through understanding a firms Strengths, Weaknesses, Opportunities, and Threats (SWOT). The very next year, Porter presented three generic strategies for firms to strategically position themselves in their industry: lowest cost, differentiation and focus (Porter). In construction, one can see how specifically, his principles of differentiation (uniquely positioning a firm and/or product by employing a unique set of processes, higher quality or performance, or advanced capabilities) and focus (pointing a firms' resources towards a specific market segment, project, or product type with the intent of establishing relationships, expertise, and economies of scope or scale) can be aptly applied in such a competitive industry. Porter concludes by stating that "once the corporate strategist has assessed the forces affecting competition in his industry and their underlying causes, he can identify his company's strengths and weaknesses."

During the last twenty years or so of the 20th century, the buzz-topic in strategic business management has been 'competitive advantage,' stemming from earlier strategy literature. (Stalk et al. 1991) introduces a new more dynamic idea called 'capabilities-based competition.' "In industry after industry, established competitors are being outmaneuvered and overtaken by more dynamic rivals"(Stalk et al. 1991). To combat this, four principles of 'capabilities-based competition' are presented to help guide a firm in the creation of strategy in a dynamic business environment. The capabilities-based competitor invests in its business processes in a way that also presents a new beneficial perspective on vertical integration. When the business environment was static, companies could afford to have static strategy, and competition was a "war of position" where 'where' a company chose to compete was more important than gaining competitive advantage (Stalk et al. 1991). But in today's much more competitive business environment strategy must be much more dynamic, and has now become a "war of movement" as (Stalk et al. 1991) calls it, where competitive advantage is dictated by a firm's ability to respond to changing market trends and customer needs. "In such an environment, the essence of strategy in not the structure of a company's products and markets but the dynamics of its behavior" (Stalk et al.). A firm has little control over its external environment, so the aim should be to focus on what it can control, and in this case, it is a firms' internal resources and capabilities. Robert Grant lays a five-stage framework for the formulation of strategy with this objective in mind. Those firms that compete on the basis of capabilities allows them to obtain the benefits of both (Growth) diversification and (Value) focus allowing them to quickly rise to the top of their

industry. Strategy has come to be defined as "the match an organization makes between its internal resources and skills, and the opportunities and risks created by its external environment."

"[Strategic] Business models are abstracts about how inputs to an organization are transformed to value adding outputs" [(Betz 2002) and(Porter 1981)]. The sole purpose of a business to make a profit and to maintain this profitability for as long as it can. Boiled to its simplest, strategic management is considering how a business makes money in the present, and how it must adapt to continue making money. It should be no surprise to anyone in any type of business, that business ventures fail. Even when the necessary elements are present such as available market, innovative ideas, adequate resources, and talented management, ventures still fail. Why is this? Because no specific, measurable strategy has been created, or because the elements are not compiled in the best order and most efficient way. In the realm of corporate real estate management, (Nourse and Roulac 1993) pose the idea that the main reason businesses do not have a formal real estate strategy, is because have not articulated any kind of formal real estate strategy. This assumption can be accurately applied to the construction industry, without the articulation of any type of strategy, the strategy cannot be defined in context of the industry market relative to the overall corporate strategy. Once a specific strategy has been formulated based on the business environment and a firm’s resources and capabilities, then construction using the elements mentioned and many more, combine to form what is known as the business model. (Morris et al. 2005) point out though that while much research has been done on which business models work and which don't,

and even some of the elements that make them up, little has been done in the way of a framework on how to formulate these models. Betz (Betz) presents that business models can be constructed using four major kinds of inputs and outputs: resources, sales, profits, and capital. Using the perspective of "two in, two out," various combinations of these four major elements, combine to form six distinct strategic business models. " A strategic business model is a systematic list of the policies that will guide the future specifications of inputs, outputs, processes, and values of the complete operations of the business of the corporation" (Betz) Morris et al. (Morris et al.) present a six component framework that can be used at three distinct levels to characterize a business model that crosses industry lines and posed as beneficial to many. The three-different progressive business decision levels are based on three distinct categories of elements that make up business models as discussed in previous research which are: economic, operational, and strategic. At the simplest level, a business model is constructed in terms of an economic model, relevant variables at this level include: revenue sources, cost structures, and margins (Stewart and Zhao 2000). At the day to day operational level critical variables include emphasis on internal processes, resource flows, and knowledge management (Mayo and Brown 1999). At the most intricate level, the strategic level emphasis is placed on market position and new growth opportunities, and important variables include value creation, values, vision, and points of differentiation (Slywotzky 1996) and (Morris et al. 2005). From this previous research and the elements found within, (Morris et al.) defines a business model as "a concise representation of how an interrelated set of decision variables in the area of venture strategy, architecture, and economics are

addressed to create sustainable competitive advantage in defined markets." From this, (Morris et al.) present a framework of six decision components that are considered at their own defined three business decision levels which are " termed 'foundation', 'proprietary', and 'rules' levels." These six components are: factors relating to (product) offering, market factors, internal capability factors, competitive strategy factors, economic factors, and growth/exit factors. At the 'foundation' level, the basic components that will make up a firm's selected business model are defined, such as how the firm will make money and its value proposition. During the 'proprietary' stage of business model development unique or 'proprietary' combinations of the previously defined decision variables are formulated to achieve strategic advantage in the firms chosen marketplace. The final level of business model development is the 'rules' level. At this level, the decision variables defined in the first level, the combination of these variables formulated in the second level, now form guidelines which rule the strategic decisions of the firm moving forward. As (Morris et al.) concludes, "the [proposed] model represents a strategic framework for conceptualizing a value-based venture." The research like presented here by (Morris et al.) is important to the strategy formulation of any business and can be particularly useful to an industry like construction where very little of these types of frameworks have been presented, but in this authors opinion are needed as can be noted by this industries lack of innovative growth in recent decades. (Tucker and Pitt 2009) suggest that in order for a firm to improve and continually evolve according to the dynamic business environment, FM performance has to be measurable in order to effectively assist the firm in meeting its 'primary business objectives.'

(Amaratunga and Baldry 2002) expound on this point by saying that, " measurement is not an end to itself, but a tool for more effective management."

Growth is what many company desires and most managers recognize that growth comes from creating innovative ways to compete and new product markets. But few of these managers take the proper steps to achieve these goals. This is what (Christensen et al. 2002) address in their research. These authors pose that when good times are abundant and the core business is growing managers see starting new growth ventures as unnecessary, but when times are bad, managers can't seem to invest in new growth fast enough to see the benefits in the bottom line. Christensen et al. (Christensen et al.) present two sets of 'Litmus Tests" that management can use when times are good to create new growth business plans that have a good chance of success if implemented properly. As Christensen, et al. (2002) concludes he states that "a lack of good ideas is not the problem. The problem is the absence of a robust, repeatable process for creating and nurturing new growth ventures," along with way to measure them. "A performance measurement system is of no value if it is not used as a guide to management decisions" (Chan). Christensen et al. (2002) lists four components that management should use to build a successful innovative growth process: start before you need to, establish an 'aggregate project plan', train people to distinguish between disruptive and sustaining ideas, and finally create processes for shaping disruptive business plans.

Much of the literature pertaining to construction as well as the strategic and financial management of this industry is focused on the larger construction firms. But small businesses are vital to any economy or industry and should not be overlooked, "in

a free market economy the importance of small companies as major job suppliers, innovators and source of growth is widely recognized" (Lussier and Pfeifer 2001). Although these firms are important the focus of this research and literature review to follow, will be on those middle-market (Tier 2) firms.

Section 2: Strategic Management in Construction

One of the first and most commonly cited in Construction Industry journals relating to strategic management is Abraham Warszakawski's Strategic planning in Construction Companies (Warszawski 1996). Warszakawski presents a five-step approach to selecting an appropriate competitive strategy for a firm: 1) examine the firms' mission and objectives, 2) Review the business environment in which the firm operates, 3) Analyze the firms' internal strengths and weaknesses, 4) Develop a 'plan B' strategy, and 5) based on the preceding analysis select the most effective strategy. Upon completion of this process, a firm can seek out potentially "favorable" opportunities that capitalize on the firms' competitive position and internal strengths. Strategic planning is an invaluable resource to a firm and should be an essential responsibility of a construction firms' management, but "realization of strategic plans require investment" (Warszawski).

Innovation is another buzzword in the business world that has been around for a while, but has recently gained increased attention. Innovation is a vital tool in the arsenal of firms in terms of growth, competitiveness, and market creation and is valuable to a firm for many reasons, such as to improve its internal efficiencies and processes and/or improve its market competitive advantage. Innovation can come in many forms such as

product innovation, process innovation, or most notably strategic management innovation. (Ozorhon et al. 2015) identified eight factors that drive innovation in the construction industry. One of the most important ones to focus on is 'competition level'. The construction industry is one of the most competitive industries in all of business. Therefore, as firms jockey to gain competitive advantage, innovation becomes a vital resource to achieve this (Slaughter 2000). But construction is unique in that the technology and products used to build really have no significant or marked difference. So where do firms differentiate themselves from their competitors? One area is in its project level and firm level management processes, in other words, Innovative strategic management.

The traditional view of strategic management in construction has been predominantly focused on management processes at the project level. (Chinowsky and Meredith 2000) highlight that most of the literature to the time of their writing was aimed at project management, where strategic management which holistically addresses the challenges that face a construction firm's operations at the firm level, has been severely overlooked. To fill this void, first the question, "what is strategic management?" needs to be answered. Four foundational concepts are listed by Chinowski and Meredith (2000) to help answer this question faced by many construction firms: strategy, strategic management, strategic planning, and strategic plans. "An idea that sets in place a path that responds to multiple internal and external influences" is the foundation that the literature has laid defining strategy [(Porter 1979); (Hamel et al. 1989);(Collis and Montgomery 1995); and(Chinowsky and Meredith 2000)). Where

historically construction firms carved out their existence in one specific market (i.e. commercial, heavy civil, residential, etc.), this is becoming less of the case due in part to the growth of companies, that in an attempt to decrease costs and risk while maintaining revenue growth, are vertically and horizontally merging and diversifying in the type and size of projects they are taking on. Thereby presenting increased competition to the incumbent 'market focused' firms. Thus, to keep up, Chinowsky and Meredith (2000), pose that the skills and strategic capability to identify and pursue a firm's own set of opportunities is critical and must be included in the strategic plan development of construction firms.

An industry such as construction is one where developing an explicit strategy and plan to carry out this strategy to address and mitigate the risks and swings in the market is critical. (Kazaz and Ulubeyli 2009) start by discussing the two basic elements of strategic planning: mission and objectives, then discuss strategic planning itself. Next strategic analysis is presented, followed by how these strategic plans can contribute to gaining competitive advantage as well as help to mitigate risks. Finally, a method of analyzing a firms' strengths, weaknesses, opportunities, and threats (SWOT) is discussed. Kazaz and Ulubeyli (2009) present five basic strategies to achieve competitive advantage in the construction industry. The other side, mitigating risk is another purpose of developing strategic plans. Kazaz and Ulubeyli (2009) list five strategies to help mitigate risks a firm is exposed to: diversification in business, restraining growth, firm shrinkage, not taking on new debt, and reducing expenditures. Of these, one of the most interesting is diversification of business. (Johnson et al. 2008)

identify three motivating factors for diversification in construction including: avoiding the ebbs and flows of the construction cycle, to increase profitable firm growth, and to increase supply chain efficiencies by controlling suppliers and greater degree of synergy. In conclusion to this article, Kazaz and Ulubeyli (2009) emphasize that the elements and framework that they have presented can assist a firm in developing and then testing a firm's strategic plan to determine whether it can bring greater success to that firm.

Through application of current strategic management literature and the analysis of trends in financial and operational performance data of 24 international Engineering and Construction (E&C) companies such as profitability, liquidity, leverage and other quantitative measures, (Cheah and Garvin 2004) present an "open" and thus dynamic model to aid firms in the formulation of strategy. Cheah and Garvin (2004) note that it is important to emphasize the distinction between an "open" model which allows for change and fluidity, and a "closed" model which depends on static factors and conditions to follow a step-by-step approach to formulate the suggested strategy. Obviously in the construction industry it is easy to see that a more dynamic model would potentially be the most beneficial. The model presented by Cheah and Garvin (2004) divides corporate strategy into seven separate fields each independent of each other and provide a definition for each. The first is business strategy. The next field is financial strategy. This field is divided into two main decisions regarding the financial strategy formulation of a firm: investment decisions and financing decisions. Investment decisions involve the balancing of capital budgets and the allocation of financial resources. Some examples of tools used in this decision-making process by Cheah and Garvin (2004) are

Net Present Value (NPV) and real option valuation each of which attempt to help balance risk and reward faced by the firm. The second decision type is financing decisions, which deal with the capital structure of a firm and various projects. For firms to make the best decisions regarding financing its operations, a firm must understand the positives and negatives of using such options as public or private debt, private equity, and specific to the construction industry how insurance and bonding can help to mitigate the risks associated with construction projects. As Cheah and Garvin (2004) point out, a strong balance sheet is a fundamental element required for construction firms to maintain successful operations and future growth opportunities. The third field of corporate strategy is operational strategy. The fourth is technology strategy. Fifth, is the Information Technology (IT) strategy, the sixth is Human resource strategy, and finally, marketing strategy. Following the seven fields of strategic management two 'internal mechanisms' are presented by Cheah and Garvin (2004) the first being firm structure: the structure chosen by a firm to produce something of value to a customer. The second is corporate structure which is the development of an internal culture that synergistically aids employees to carry out the firms' strategic plan in an efficient manner. From this research two conclusions can be drawn: the external business environment is not static but changes and changes rather quickly. A proposed solution is presented by Cheah and Garvin (2004) in which firms treat each of the seven fields and two 'internal mechanism' all as building block elements which can all combine in many ways to produce a dynamic strategy formulation applicable to each individual firm. The second conclusion is that by treating these seven fields and two mechanisms as building blocks that all

interact with each other in separate ways then the combination of such variables can take on different forms that can be used in a plethora of or dynamic array of situations faced by firms of different types. Cheah and Garvin (2004) conclude by stating that " strategic actions that are derived from the interactions between two or more strategic fields are more powerful in shaping a sustainable and successful [dynamic] corporate strategy than those that are confined both in terms of origination and impact, within only one single field [static]."

No one can argue that in the constantly changing business environment that construction finds itself, it is hard to strategically plan for the long term under these circumstances, but (Price and Newson 2003) state that "construction organizations need to recognize that strategy (or strategic content) is the flag that needs to be placed as a future target and aimed toward, in the knowledge that the organization must be nimble enough to change direction as new opportunities arise." Price and Newson (2003) present a paper that discusses strategy and the elements of strategic processes. Three dimensions of strategy are first presented in describing the strategic management process, based on (De Wit and Meyer 1998), which are: strategy process, strategy content, and strategy context. Strategy process is the 'how, who, and when' of strategy and is literally the process of how strategy comes into being. Strategy content is the actual result or product of strategy process and is the 'what' element. Strategy context is the 'where' and are the internal and external conditions that the firm determines strategic process and content. The next part of the strategic management process that is addressed is the strategic analysis element and (Price and Newson) divide this, as is common in the

literature, into three segments: the external audit which is the assessment of the external conditions surrounding the firm. The internal audit which analyzes the internal processes, capabilities, and strengths of the firm. Finally, as the third segment of strategic analysis is the SWOT analysis, which is a tool to assist firms in examining their strengths, weaknesses, opportunities, and threats and how the firm's current strategy can deal with the business environment in which the firm is operating within (Johnson et al. 2008). The third step in the strategic management process is the actual strategy formulation based on the previous assessments and current business environment. According to relevant literature on the topic, this strategic formulation must be based on consideration of three generic strategies that (Porter 1980) presents: cost leadership, differentiation, and focus. The final step is strategy implementation which according to (Price and Newson 2003) and (Johnson et al. 2008), requires the translation of strategy into action that involves both physical actions implementing strategic processes, but also fostering a culture that supports this implementation. Historically construction organizations have focused on improving its project organizational effectiveness at the expense of long-term strategies, but to be successful in the future, Price and Newson (2003) state that firms need to supplement these short-term project effectiveness strategies with long-term strategies.

While many papers have been written on strategic management, few have outlined a methodology with which to support the decision-making process. According to (Venegas and Alarcón 1997) strategic planning involves four steps: First, to clearly define a firms' current position and thus analyze and review both the internal and

external factors of the business environment. Then establish the expected future position of the firm, "translated by mission, objective, performance indicators, and [defined goals]." The third step, is upon establishing the current position and the future expected position, review and select a course(s) of action that narrows the existing gap between the current and defined future position. Finally, further elaborate the selected strategy and plan to implement the strategies into each facet of the "operati-(Beckers et al.) decisions systems" within the firm. The authors translate these four steps into a systematic three-"module" approach. The article discusses several specific factors that impact the strategic decisions process for a construction firm in five levels: external factors, strategies, drivers, processes, and goals. Two specific levels are important to point out, the first is Drivers. According to the authors, "drivers are variables directly impacted by the implementation of the strategy… that spread their effects to the corporate goals" (Venegas and Alarcón). Drivers typically consist of a performance element such as project quality. These drivers impact a firm's processes like financial management and thus directly impact the goals defined by the construction firm. The second level worth mentioning is in fact these Corporate Goals, these defined goals are used to reflect the ultimate impact that the selected strategy has had on the firm, and thus are very important to the firms' executives in evaluating these selected strategies along the way. Through the three-module framework that is described above, the authors outline a framework that offers construction firms a path to follow during the evaluation and selection of a strategic plan.

The construction industry being one that is extremely competitive, places a great amount of emphasis on strategic positioning and how it competes in the market so as to gain competitive advantage. (Kale and Arditi 2002) present an empirical analysis showing the impacts of construction firms mode and scope of competition and find that they are significantly correlated to company performance based on three metrics: profitability, growth in contract awards, and overall performance. The research presented here further illustrates that when it comes to selecting a firm's strategic position, finding a balanced yet diversified approach in terms of how it competes and where it competes, all help firms achieve competitive advantage in the competitive construction industry. In the end (Roulac 2001), speaking in terms of property management firms, states that " the prospective payoff of superior corporate property strategy is enormous." This same statement holds true for most construction firms. Through the strategies described in his work an organization can potentially accomplish many various business objectives, examples being: strategic advantage, business growth, business profitability, wealth creation for the company and its shareholders. By adopting a firm (corporate) level view of strategic management, along with strong leadership and vision, construction firms can rise to the top of its industry and remain there by developing dynamic strategic plans that allow them to respond to the constant changes in the construction market.

Section 3: Financial Strategy in Business

In the last twenty years firms have become increasingly aware of their financial resources and capabilities, and the returns that can be drawn from strategic management of these assets. (Krumm et al. 1998) states that firms who think to only provide cost

effective and quality products and services are finding that this is no longer a guarantee to success. But rather the ability of these firms to create value from their internal capabilities and resources is becoming more so the lynchpin of success (Dierickx and Cool 1989).

The capital structure of a firm should be viewed as one of these important capabilities that is vitally important to a firm regardless of industry, as it impacts the firm's day-to-day operations as well as has the power to create growth opportunities for the firm or restrict growth. Literature on the topic though has, according to Low and Chen (2004), been unable to list many of the factors that impact a firm's capital structure, and this is what (Low and Chen 2004) attempt to do in their research. The research by Low and Chen (2004) thesis both domestic US firms as well as multinational US firms that are either product focused or product diversified and how these characteristics impact a firm's capital structure. Of particular importance, though to the construction industry is that the results of this thesis indicate that product diversification is positively correlated to financial leverage, meaning that product (or market) diversification allows firms to reduce their risk which is very impactful potentially to construction firms. An important note made in this thesis is that (Barton and Gordon 1987) point out that a firm's strategy should 'complement and enrich' a firm's understanding of the firm's capital structure decisions. Relevant to the construction industry, this means that due to the dynamic nature of the industry and the importance of cash to meet short term liabilities (i.e. payments for materials and to sub-contractors) firms should match its leverage ratios to its external environment and to its strategic

goals. As noted by Low and Chen (2004) product (and Market) diversification is associated with lower risks that a firm is exposed to. Five variables that Low and Chen (2004) listed in their thesis are of interest to the construction industry and how they are correlated to each other. Leverage: which is the debt ratio (total debt/total assets), product diversification (classified as high, medium, low, and no diversification). Risk: having high or low debt levels and the ability to meet these debts (i.e. bankruptcy risk-determined by liquidity ratio: quick ratio), market-to-book value of equity which can be used to determine a firm's growth opportunities and important to the valuation of the firm. The last of these is a firm's size, determined by total assets and revenue volume. The results of this thesis indicate via a pearsons correlation (being statistically significant by having a p-value <0.01) that the leverage variable is positively correlated with the product diversification, market-to-book equity value, and size variables, but are not statistically significant. Second, the leverage variable is negatively correlated with the risk variable and is not statistically significant. The major takeaway from this thesis relative to the construction industry is that the results of the thesis by Low and Chen (2004) show that the leverage ratio, product diversification, risk, book-to-market value, and size variables are all correlated to each other. Most importantly this thesis helps to illustrate the positive correlation of several ratios that help to profile the high growth potential companies: higher product diversification, average debt ratio around 65%, lower market-to-book value, higher liquidity position (i.e. higher quick ratio), higher in class total assets and revenue volumes. Alas, although the research by Low and Chen (2004) was not able to support both of its initial hypotheses, the findings of the thesis do

indicate that the more diversified the firm, the higher the debt ratio. Which this is not entirely a bad thing, due to the fact that this firm could be in a higher growth opportunity position dependent upon its position in the other listed metrics.

A corporation's potential for growth, financial improvement, and improved capital structure is not entirely dependent on the firm's actions. (Antzoulatos et al. 2016) state that, dominant theory regarding capital structure is based on the supply of capital being 'perfectly elastic,' which implies that a firm's leverage is completely reliant on the firms demand for capital. Antzoulatos et al. (2016) aim to examine the impact that financial development has on the firm capital structure and the financials constraints that a firm is faced with. This thesis examines US firms from 1970 to 2007, and the results found by Antzoulatos et al. (2016) indicate that economic factors such as financial development, significantly affect capital structure. Financial development was found to be the primary driver of the convergence of firms' leverage ratio according to Antzoulatos et al. (2016)'s thesis, and that leverage is positively correlated with the financial Market development for the firms found in the big convergence group. And Antzoulatos et al. (2016) also found that these big group firms tend to increase debt as financial development increases. The work of Antzoulatos et al. (2016) has two primary contributions to the current research on the topic: first it provides empirical evidence of the "convergence in capital structure," seemingly indicating a successful model for firm capital structure. Second it helps demonstrate financial developments impact on a firm's leverage ratio. The economic impact on a firm's leverage and financing decisions is a valuable piece of information to those construction firms with high growth potential,

particularly in light of the trend that the firms found in Antzoulatos et al. (2016)'s "big club" tended to increase leverage ratios as financial development improved while these firms also tended to have higher profit margins, increased growth opportunities, and more real assets. Therefore, as firms begin to act on their growth opportunities, it is good to model its capital structure after firms in Antzoulatos et al. (2016)'s "big club" based on these results.

(Cheah et al. 2004) presents a useful five-piece template to analyze the collected data is presented. This template considers several factors such as a few key financial indicators of a firms' performance and points out a few observations based on the results. Two observations of note in this thesis are illustrated graphically as a tradeoff between Net Profit Margin (NPM) and (TAT) or Total Asset Turnover (referred to as volume/growth.) Conventional strategic management theory would suggest that firms strive for both high profit margins and high asset turnover, but as the data collected by (Cheah et al.) displays, this is an extreme challenge for construction firms. This fact illustrates the importance that defined and specific financial strategy needs to be pursued by every construction firm in order to use the resources available to them most efficiently. The authors also point out two potential solutions to do so, the first is to pursue a differentiated strategy in an attempt to achieve higher profit margins (Porter 1980). The second is to "aggressively" pursue a high asset turnover (growth) strategy to gain higher market share (Cheah and Garvin).

(Hawas and Cifuentes 2014) address two different approaches to project valuation, which as is well known, is vital to a construction firm in determining the

viability of a project and the expected returns against the expected costs. These authors compare two common approaches to project valuation: The Discounted Cash flow (DCF) method and the probabilistic characterization of cash flows. Hawas and Cifuentes (2014) highlight that typically the favorite method of project valuation and is taught in nearly all business schools, is the DCF method. This method values projects by discounting all of its future cash flows with an appropriate rate that is adjusted for risk. The challenge in the method lies in that generally firms discount these cash flows at the Weighted Average Cost of Capital (WACC) which is often hard to estimate due to the time-dependent aspect of project financing and the volatility of such. The second approach to project valuation is founded on laying out the project cash flow in a probabilistic manner. This is done through capturing the uncertainty of cash flows using their means, SD's, and correlations as opposed to the discount rate. Critics of the DCF method highlight that the DCF method mixes the time value of money and risk, which many critics state are two very different things. But despite this fact, the probabilistic method has not gained much traction as a project valuation method. Hawas and Cifuentes (2014) use Net present value (NPV) and internal rate of return (IRR) as the metrics (which are most common) to determine the soundness of an investment project. As a reminder to the reader, Hawas and Cifuentes (2014) breakdown the two essential elements needed in the valuation of projects: to identify and estimate the sources of cash inflows, and outflows, second combining all of this information to formulate the cash flow analysis. The results of Hawas and Cifuentes (2014)'s thesis indicate two findings addressing the issue raised against probabilistic characterization of cash flows: first "in

terms of estimating the expected values of both NPV and IRR, correlation is almost irrelevant;" second IRR is negligibly impacted by correlation assumptions.

As one in the real estate development and/or construction industry most certainly understands, these industries are inherently risky. Therefore, in order to manage these risks firms must understand the types and characteristics so as to be able to develop strategies to mitigate these risks and boost the return on investment gained from these projects. (Wenhua 2013) aims to list the various types of common internal and external risks associated with real estate which many of these, in this authors opinion, can be applied to the construction industry as well. The four internal factors that Wenhua (2013) presents are: the irrationality of capital structure due to ability to access capital funding (the typical debt financing for these types of projects is between 70 and 90% which presents a high financial risk), the second is poor liquidity of these assets at times dependent on the market, lack of profitability due to poor choice in projects as well as at times the highly leveraged position taken to take on the project, and finally the corporate governance structure being good or bad. Wenhua (2013) then presents three financial risk prevention strategies to address the various characteristics and types of risk discussed. The first is " financial risk prevention strategies based on industry perspectives." The second strategy is to "strengthen the company's financing capacity and reduce its debt risk," which consists of four elements: diversify the financing sources, determine the appropriate level of financing and provide reasonable arrangements for the financing structure, and third: to improve the financing decisions making based on strategic and planning and supporting frameworks, lastly to improve

the firm's corporate governance structure by establishing "efficient incentive and restraint mechanisms." The third and final strategy that Wenhua (2013) presents is "prevention strategies based on the enterprise view" which are strategies founded in "excellent real estate [or project selection]" and seek to improve the firms core competitiveness by improving the quality of firm's product and project offerings. Given that the construction industry is as risky as it is, this is indeed a valuable tool available to firms.

Section 4: Financial Strategy in Construction

A major factor indicative of success in business, and specifically the construction industry is a firm's ability to strategically manage its direction, growth, and the risks that are associated with these actions. (Yee and Cheah 2006) explore the relationships between two specific business strategy types (internalization/product-market diversification) and two financial strategy elements (asset liquidity and firm capital structure). Each of these four factors are believed by Yee and Cheah (2006) to be related in the context of firm growth and the risk management that accompanies this growth. Yee and Cheah (2006)'s thesis is broken into three parts: the internalization strategy's impact on liquidity and capital structure, product/market diversification's impact on liquidity and capital structure, and what insights can be gathered from the first two sections. Regarding the internalization strategy, Yee and Cheah (2006) found that firms employing the internalization strategy statistically had higher levels of liquidity (as measured by the current ratio), dictated by the increased risk inherent in a growth strategy such as internalization. Internalization is defined by Yee and Cheah (2006) as "a

means by which a firm seeks business expansion along the geographical dimension." This author would also add to this definition of internalization, the expansion along firm function in the form of vertical integration. Firms employing this strategy type not only had elevated liquidity ratios to help cushion increased risk, but this strategy type also impacted the capital structure of the firm. These firms tended to have decreased Debt/Equity (D/E) ratios to help offset the risk of internalization by decreasing its risk exposure due to increased debt leverage. The second part of Yee and Cheah (2006)'s work addressed the firms employing a product/market diversification strategy. (Gluck 1985) defines the diversification strategy "as a means by which a firm expands from its core business into other product/service markets." Pertaining to the diversification strategies' impact on firm liquidity and capital structure, Yee and Cheah (2006) found that more diversified firms could afford and thus typically did, have decreased levels of liquidity due to their diversification strategy. The more diversified a firm is, reduces the risk that that firm is exposed to due to the decreased reliance on a single market or product type. Also, Yee and Cheah (2006) found that the diversification strategy impacted the capital structure of a firm, as typically the more diversified firms had increased leverage ratios. This aligns with the assumption that firms trying to increase their value by way of increased market share, need more capital to do so and thus are leveraged more as a means to achieve this goal. Finally, in conclusion, Yee and Cheah (2006) suggest two paths to firms based on their findings. First, if a firm cannot increase its liquidity, or is already in a lower liquidity position it would perhaps be better to pursue the diversification strategy. Alternatively, those firms who find themselves

enjoying higher liquidity, and in a less levered financial position, should perhaps actively pursue the internalization growth strategy as they are in a better position to financial cushion the inherent risk that is associated with this type of strategy.

Ercan and Koksal (2013) thesis the effects of strategic growth and competitive strategies on a set of financial strategies. This thesis is one of the first in the industry to begin exploring the connection between strategic management practices and financial strategy and theory. The construction industry is rapidly changing with the introduction of new, advanced operational and information technology. "Under these new and competitive market conditions, construction companies are expected to have pre-designed planned growth and financial strategy (Ercan and Koksal 2013)." In an extremely competitive business environment such as the case in construction, identifying and implementing financial strategies are crucial to a firms' success. The thesis conducted by Ercan and Koksal presents a framework for viewing the relationship between corporate and financial strategy. Three competitive [Value] strategies (drawn from Porters three generic classifications of strategy) and four growth strategies are analyzed in terms of their impact on three specific financial strategies found in various literature in the industry. The results of a survey based thesis using Multiple Analysis of Variance (MANOVA) indicate that "competitive strategies (i.e. Cost-Leadership, Differentiation, and Focus) are more effective than growth strategies as to their significance level for financial strategy (Ercan and Koksal)." More specifically and interesting is that the financial strategy most impacted by the competitive [Value] and growth strategies was "short-term liquidity and efficiency strategies (Cheah et al.

2007).” When one ponders these results, it does make logical sense that this is the financial strategy that would be most impacted by competitive [Value] and growth strategies. To answer the question as to how one could reasonably come to this conclusion, it is beneficial to point out that this particular financial strategy is based on a construction firm’s liquidity status (Ercan and Koksal). The liquidity status as the authors state, is the ability of a firm to demonstrate that it can pay off its mature debts, and as one may surmise this capability is crucial in an industry with such market volatility and are an important piece of the puzzle to those who lend money to the construction firms (i.e. banks, private equity funds, etc.). In summary, Ercan and Koksal state that the capital structure and solvency strategies (long-term, where liquidity status = short-term) are of relatively higher importance for gaining a competitive edge in the construction industry where the “Differentiation” strategy (Porter 1980), is the most common approach.

Revenue, and subsequently profit growth, is the bottom-line goal for every business. Business in general is faced with the challenge in a competitive marketplace to gain competitive advantage. Through the years many suggestions, models for success and strategies have been discovered, researched, and passed down. Therefore, another challenge faces firms today, which one of the strategies and compilations of strategic elements actually works to help firms achieve its goal of profit growth? (Cheah et al. 2007) present research on which of these strategies and strategic elements contribute to firm growth in terms of revenue and profit. Now these authors research firms in China, but this author believes the principles found here apply generally to construction firms in

the US as well. Cheah et al. (2007)'s work relies on two primary schools of thought in terms of strategic management: the industrial organization and resource/competence based views. According to (Lenz 1980), competitive advantage typically refers to firms attaining superior advantage in some area, and as is the case in the construction industry this is commonly growth in revenue and net profit. Cheah et al. (2007) presents five types of general strategies based on the works of [(Porter 1980); (Kale and Arditi 2002); and (Cheah 2002)]. These include cost leadership, differentiation, geographic diversification, market/product diversification, and functional diversification or vertical integration. Next, five different "important resources and competencies (IRCs) are presented which are basic elements of strategic formulation. The first of these is a Chinese word guanxi, referring to the development of relationships by a firm with other players, suppliers, and financiers. The second is the ability of a firm to develop and adopt innovative and technological capabilities. Third, the financial capabilities of a firm which refers specifically to three capabilities: ability to acquire capital and financing, the ability to make sound, strategic investments and project investment, and lastly the ability to effectively manage its finances. The fourth IRC is project management abilities, which should be relatively straightforward to the construction professional. The last is the firm's reputation. With these five basic strategy types and five elements of strategy, Cheah et al. (2007) ran basic regression and correlation analysis to determine which of these directly impacts a firm's revenue growth, profit growth and overall performance. In the context of the five strategy types, Cheah et al. (2007) found that only two strategy types statistically contributed directly to the three metrics presented: the "differentiation"

strategy and the “market/product diversification” strategy. Regarding which of the five strategic elements directly affected the three measurables, there were three: the relationship development (guanxi), the innovation and technological capabilities, and the financial capabilities. When choosing the type and building blocks of strategy formulation along with the mode and scope of competition, research such as Cheah et al. (2007)'s can assist a firm by providing empirical evidence of the strength of certain types and elements of strategy. Strategy has been a way for other industries to navigate their competitive environments, and should become more and more the way for construction firms to do so as well. Alas the information like Cheah et al. (2007) presents goes a long way in helping firms to see the value of, and specifically which types and elements can help it to get there.

SECTION 5: Financial Metrics

Financial ratios are a very valuable tool for any business in their ability to assess a firm’s capabilities to meet debt obligations, meet statutory requirements, and evaluate the firm’s performance with its rivals and in meeting its goals. (Whittington 1980) presented two basic functions of financial ratios: the comparative property with an industry standard, and the predictive function that they can serve. (Barnes 1987) presents an analysis and review on the use of financial ratios that help to support the use of financial ratios and specific categories of ratios that are of particular use for an array of industries, construction included. The selection of ratio is difficult and contentious due to the overlapping of information, if all the ratios were used, there would be redundancy, yet if only the completely independent ratio were used, not all information would be

provided. The difficulty lies in finding those ratios (or categories of ratios) that present all relevant information, while minimizing duplication of data. (Pinches et al. 1973) conducted fundamental research using factor analysis to determine the stability and long-term usefulness of financial ratios. The results of their thesis showed that seven financial ratio categories were most useful: return on investment, capital turnover, inventory turnover, financial leverage, receivables turnover, short-term liquidity, and the cash position maintained usefulness stability over time. The work of Barnes (1987) provides the support framework for the use of financial ratios in comparative and predictive functions.

The issue though lies in the fact that there are roughly 50 different financial ratios that can be used for analysis, so which ones are the most appropriate? Research has shown though that there are about 25 financial ratios that are relevant and useful to the construction industry [(Kanto and Martikainen 1992) and (Olinsky et al. 1996)). Historically there has been two primary ways to classify these financial ratios, the first is the more traditional approach which seeks to highlight the key dimensions of the firm and the performance thereof by classifying these ratios. The second classification of financial ratios is done using a factor (loading) analysis. (Lev 1974) first divided the financial ratios into four categories according to their conventional business interpretation: profitability ratios, liquidity ratios, financial leverage (long-term solvency) ratios, and efficiency ratios. Each of these categories are created by arranging ratios into groups based on the common goals of these ratios. Therefore, the profitability ratios are concerned with the evaluation of the firm's operational performance. The

liquidity ratios are primarily focused on indicating a firm's ability to meet its short-term financial obligations. The Financial leverage ratios are most concerned with a firm's long-term solvency and its ability to meet its principal and interest requirements on long-term debts. Lastly, the efficiency ratios are created to determine the operational efficiency of a firm. This traditional classification of financial ratios has been recently challenged by the factor (loading) analysis method of classification. Kanto and Martikainen (1992) introduce a tool with which to thesis the empirical validity of this traditional classification of financial ratios, whereby they were able to investigate the appropriateness of the a priori classification pattern of financial ratios first presented by Lev (1974). 12 financial ratios were analyzed of 26 Finnish firms to determine the validity of this classic categorization of ratios. The twelve were broken into four 'factor categories,' which were the same as Lev (1974)'s four categories. The twelve ratios, three in each category are as follows: 1. Profitability: return on assets, return on investments, earnings to sales. 2. Financial Leverage: debt to equity, debt to sales, equity to capital. 3. Liquidity: quick ratio, current ratio, and defensive interval. 4. Efficiency: inventory turnover, accounts receivable turnover, accounts payable turnover. Using factor analysis on the above ratios and 'factor' categories, the results showed that each of the twelve ratios were highly correlated with each other, confirming their usefulness and accuracy, but the empirical classification presented by Lev (1974) was poorly applicable according the work by Kanto and Martikainen (1992).

Finally, three important points can be drawn from the thesis on financial ratios by Kanto and Martikainen (1992): first, the quick ratio appeared to outperform the other

two ratios in terms of short-term solvency (Liquidity), indicating a higher degree of usefulness. The second point found in the thesis was the fact that the financial leverage and efficiency ratio categories were highly correlated with each other. The third and final point is that regarding the financial leverage ratios, the two strongest ratios were equity to capital and debt to equity. In summary, the findings of Kanto and Martikainen (1992) indicated that these twelve financial ratios are highly correlated and useful to decision makers.

SECTION 6: Growth vs Value Strategy

When it comes to improving profit margins and boosting revenue growth, companies often devote substantial time and resources to innovate its products and processes, which is often quite costly. But the returns on these types of investment are inherently very risky. In today's competitive business environment, many firms are seeking ways to mitigate this risk while still attaining the revenue growth they desire, and many are turning to a more holistic approach: [strategic] business model innovation. In fact, a global survey conducted by the Economist Intelligence Unit found that 54% of nearly 4000 senior managers chose innovative business model improvements over new products and services as a method of improving its competitive advantage. Another thesis by IBM found that companies whose operating margins had outpaced the competition over the last five years were two times as likely to favor significantly, business model innovation over product or process innovations. (Amit and Zott 2012) define a firm's business model as "a system of interconnected and interdependent activities that determine the way the company "does business" with its customers,

partners, and vendors." This business model innovation is important to firms and its managers for several reasons, but one stands out: it is often very difficult for competitors to replicate or imitate an entire business model system, whereas products tend to be much easier to imitate or undermine. Business model innovation also allows the firms to be competitively dynamic which is critical as Amit and Zott (2012) state that " competitive threats often come from outside their traditional industry boundaries." The usefulness of this thesis can be summarized by the words of (Eisenhardt and Martin 2000), "the organizational and strategic processes of firms are important because they facilitate the manipulation of resources into value-creating strategies." All of which support the assumption that the presence of defined financial strategy has a profound direct and indirect impact on business growth, particularly in construction.

The last two decades has seen a resurgence in the exploration of competitive strategies, particularly in construction, post 2008. Achieving competitive advantage through strategic implementation of high level processes is a vital tool in creating value for a firm. (Teti et al. 2014) seeks to investigate the impact of a defined competitive strategy, either differentiation or cost leadership, on the value created for the firm. These competitive strategy types are drawn from Porter (1985)'s foundational work. Porter (1985) defines competitive strategy as "the search for a favorable competitive position in an industry, the fundamental arena in which competition occurs, and aims to establish a profitable and sustainable position against the forces that determine industry competition." Using this definition, Teti et al. (2014) explore the relationship between profitability and the two previously mentioned generic strategy types. The results of this

thesis were of great interest, one specifically that Teti et al. (2014)'s thesis indicated was that companies competing on the basis of differentiation strategies do not perform better or worse in terms of profitability than those on the basis of cost leadership. But those firms actively pursuing a defined strategy outperformed those who were not. Amit and Zott (2012) state, "Having an intentionally designed and structured business model is essential for firms to look beyond traditional innovative improvements and can lead to higher revenue growth and margins."

Businesses, both public and private consistently face the dilemma of whether to adopt strategies to increase the value of a company (i.e. cost cutting via increased operational efficiencies, etc.) or to adopt strategies that contribute to the overall growth of the firm (i.e. entering new product type markets, vertical or horizontal acquisition or mergers, etc.). Traditional research on the topic of value strategy has continually stressed the importance of extracting all that a firm can out of its resources, and to erect barriers to the outside competitive forces as a way to "capture value." These types of strategies suggest that to increase the profits of the firm, a firm needs to capture as much of the market share as possible, which is true, but to an extent. These types of strategies assume that the market share is fixed, which is simply not the case, as new markets and products coming online are constantly shifting the size of the market share available for "capture." In contrast, some relatively newer research has focused on the concept of "value creation" which strives to improve the relative value of the firm's product from the customers perspective in terms of increasing the customers valuation of the product (Priem 2007). This dynamic approach is what (Aspara and Tikkanen 2013) present in a

configuration approach to strategy that examines the impact of value creation vs. value capture strategies on the financial performance of a firm. Much research on either of these strategy types has focused on one or the other regarding their impact on firm profits, yet Aspara and Tikkanen (2013) examine these two strategy types not only independent of one another, but also in combination to more fully understand their impact. The results of Aspara and Tikkanen (2013) thesis indicate several findings, the first is that neither of these strategy types have an independent impact on financial performance. Moreover, Aspara and Tikkanen (2013)'s found that engaging in both of these strategy types simultaneously is possible, and likely beneficial for large firms but not small firms. Next, a higher emphasis on a value capture strategy did not result in a positive impact on financial growth, even resulting in a negative one occasionally. Finally, a high emphasis on value creation strategies and low on the value capture strategies can be possible and perhaps improve the financial performance of both small and large firms alike. This research highlights the fact that value creation strategies, even in times of economic distress, can be a mechanism that small to middle market size firms can implement in order to achieve improved levels of financial performance.

Risk is an inherent aspect of the construction industry, particularly for the small to medium sized firms which are typically more locally concentrated and "vulnerable to local economic problems, [and] often possess less efficient organizational structures and risk management, and are highly dependent on volatile or clustered markets" (Raudszus et al. 2014). Not only in the construction industry, but a score of other industries as well, the discussion of diversification and its value adding and Beta (risk) reducing effects

have been popular over the last decade. According to Raudszus et al. (2014), builders shoulder high-levels of inherent risk, but one increasingly popular strategy to overcome these vulnerabilities have been merger and acquisition (M&A) strategies. Raudszus et al. (2014)'s work brings the advantages of these strategies to light. One specific conclusion can be drawn from this paper and is strategically most relevant to those construction firms pursuing risk-reducing M&A strategies. This conclusion that can be drawn from Raudszus et al. (2014), is that in both the short and long-term, the asset beta (risk) of small to medium sized firms engaged in vertical M&A diversification transactions decreases. In short, the results of Raudszus et al. (2014) work can be summarized as: vertical type M&A is more desirable than horizontal M&A, and even more so to lateral M&A types specifically in terms of risk reducing capabilities as well as asset value increase. This is not to say that horizontal or lateral M&A's do not have some advantages, but for small to medium (mostly medium) sized firms, the most adept value strategy at reducing the inherent systematic risk these firms are exposed to, is vertical diversification.

Historically, second only to increased profits in the corporate sense, is firm growth. Growth is highly sought after by many firms in existence today. Yet (Higgins 1977) highlights a fundamental point that still rings true today, that firm growth can be a two-edged sword if not properly evaluated, understood, and pursued. Higgins (1977) presented the idea of sustainable growth that is extremely valuable to any firm that might pursue higher growth strategies. While Higgins (1977)'s work primarily focuses on the public corporation sector, public and private construction firms can find the research and

proposed model most useful. Higgins (1977) defines sustainable growth as "the annual percentage of increase in sales [construction revenue] that is consistent with the firm's established financial policies [as should be dictated by the financial state of the firm]." Using the proposed model, a firm is able to calculate its sustainable rate of growth. If the firm's actual growth rate differs from is sustainable growth rate, then Higgins (1977) suggests that a firm will need to alter its strategy and goals accordingly, as it will not be able to attain its financial goals under these circumstances. Higgins (1977) further suggests that under these circumstances firm executives have two options: either ignore the discrepancies, or develop an alternative growth strategy and subsequent goals. A firm's actual growth rate can either be less than, equal to, or greater than its sustainable rate of growth. An actual growth rate below a sustainable level is a much easier problem for firms to deal with as this can indicate that a firm has an overabundance of capital to meet its financial obligations, and can signal a firm to increase its liquidity and lower its leverage ratios when possible. An actual growth rate above a firms determined sustainable growth rate can, according to Higgins (1977) be much harder to deal with. Four suggestions are offered to firm's whose actual growth rate is greater than its sustainable levels: sell new equity (for public companies), relax financial constraints (i.e. take on more debt), improve operating performance, and lastly to make growth a "decision variable." Drawing on the idea that not all growth is good growth, firms can follow Higgins (1977)'s recommendation that firms should not treat growth and completely beneficial. Firms should rather first assess its financial position before deciding to pursue growth, then if increased growth strategies are determined potentially

beneficial the firm must calculate its sustainable level of growth using the model presented by Higgins (1977). Higgins (1977) presents foundational knowledge that can assist firms and executives in fully understanding both the pros and cons of taking on growth strategies.

(Kim and Mauborgne 1997) present a powerful examination of the differences in those firms that are able to achieve high rates of firm growth versus those that cannot and what exactly drives this ability. In every case of a high growth company, its management described what the author termed as the "value innovation." These ‘high growth’ firm managers and leaders all saw the five dimensions of strategy: industry assumptions, strategic focus, customers, assets and capabilities, and product and service offerings in dynamic terms different from its competitors. Kim and Mauborgne (1997) describe the differences in executive attitudes along each of the five dimensions of strategy, that differentiate the high growth firms from the rest in the following ways. First, regarding 'Industry Assumptions', traditional firms see industry conditions as a given, where the high growth firms see these same conditions as being able to be shaped. Second, high growth firms sought to make an innovative advancement in its product or service, rather than simply aiming to beat the industry standard along traditional lines. Next, traditional firms seek to build upon its existing customer base by providing increasing customizations and specialization of its services, while high-growth firms seek out the core aspect that all customers desire at a basic level and build upon this. Fourth, high-growth firms are not bound by what its current assets and capabilities are, but rather ask themselves "what would we do if we were a startup", which is in stark

contrast to traditional firms which only view strategy in terms of its current assets and capabilities. Finally, traditional firms attempt to maximize the value of its products that fall in the industries traditional categories, while high-growth firms seek out a holistic solution that can meet a customer's needs along many dimensions including those that may fall outside the firm's realm of current expertise.

As summarized by (Quader 2017) , traditional literature covering the topics of firm financial constraints and firm growth has focused on the impact of a firm's financial constraints on the investment decisions, yet Quader (2017) attempts to analyze the quantitative impact of a firm's financial constraints on firm growth, while also taking into account the variance in firm sizes. As growth is extremely important and a high priority for most firms, it is equally important to understand the various constraints that affect firm growth. From this information, a firm can then formulate a growth strategy that considers these effects. This analysis yielded two results that are of particular importance to those [construction] firms seeking to understand, develop, and pursue a growth strategy. The first is that there was found to be a "non-monotonic U-shaped" relationship between firm size and growth. This means that smaller firms will be able to achieve high growth levels in the preliminary stages, but will reach a point where this slows to perhaps zero and stabilizes, then as the firm size stabilizes it can again grow at a more sustainable rate if the strategy is developed correctly. The second result of Quader (2017)'s thesis is that growth is highly sensitive to cash flows in a firm under financial constraints. The remedy to this problem proposed by (Quader 2017) and (Carpenter and Petersen 2002) is that firms should attempt to leverage its assets and current capital to

take on new debt in order to increase cash flow and loosen the financial constraints facing firm. This strategy can aid a firm potentially in improving its profit generating capacity, which this improvement can potentially lead to a firm enjoying an increased rate of growth Quader (2017). Research such as this is important to any [construction] firm seeking to develop a growth focused strategy because findings such as these can further a company's understanding of the impacting factors of growth along with strategies to overcome them. Findings such these by Quader (2017) and Teti et al. (2014) are of particular interest when examining the competitive strategy options available to firms in construction where margins are very slim. A firm orienting itself more towards differentiation can potentially add value to the firm long term, increasing its prospects of growth in the future, thus lending itself to those firms whose primary strategic goal is to grow the firm.

Research has cited many times over, the importance of innovation as well as stressing the importance of high quality in the development of firm strategy, yet much of this research has only addressed these factors as independently impacting growth and profitability individually. (Cho and Pucik 2005) attempt to highlight to a greater extent, the relationship between quality and innovation, and their impact, both separately and together, on growth, profitability, and firm value. Data was collected using the Fortune Corporate Reputation Survey (FRS) sent out to Fortunes' 1000 top companies list. Using Regression analysis and a structural equation model, Cho and Pucik (2005) were able to analyze the relationship between quality and innovation and their impact on growth, profitability, and firm value. The results of Cho and Pucik (2005)'s work yield 4 things

upon which a conclusion can be proposed. These results are first, that a firm's degree of innovativeness (measured via survey questionnaire based data) has a moderating effect on the relationship between quality and a firm's growth. Secondly, the relationship between a firm's degree of innovation and its profitability is moderated by a firm's quality emphasis. The third result is that a combination of innovativeness and quality emphasis can have an impact on a firm's market value. Lastly, both profitability and growth likewise impact a firm's market value. From these results, Cho and Pucik (2005) propose what they refer to as the "innovativeness-quality-performance model (IQP), which describes how a firm's capability to balance innovativeness with quality drives growth and profitability, and in turn drives superior market value." Cho and Pucik (2005)'s research helps to support the idea that growth and value strategies are not to be pursued exclusively as "quality alone is not sufficient to create high growth, and innovativeness alone is not sufficient to improve profitability" but rather these two strategies and the tools used to pursue them should be pursued together (Cho and Pucik, 2005). The key therein lies in the degree each strategy is pursued, and subsequently according to Cho and Pucik (2005), how well a firm is able to balance its emphasis on innovation and high quality.

APPENDIX 5 - COMPLETE STATISTICAL ANALYSIS OVERVIEW

Introduction

This Thesis wished to assess the relationship between gross profit and net income before taxes and five measures useful financial metrics indicative of current financial position: working capital turnover, quick ratio, debt/equity ratio, return on assets, and return on equity. This relationship can be shown by calculating the Pearson correlation between variables. The Pearson correlation shows both the strength and direction these relationships. A correlation close 1 indicates a strong positive relation, a correlation close to -1 indicates a strong negative relationship, and a correlation close to 0 indicates that there is little to no relationship. The following shows the Pearson correlation between all the variables of interest.

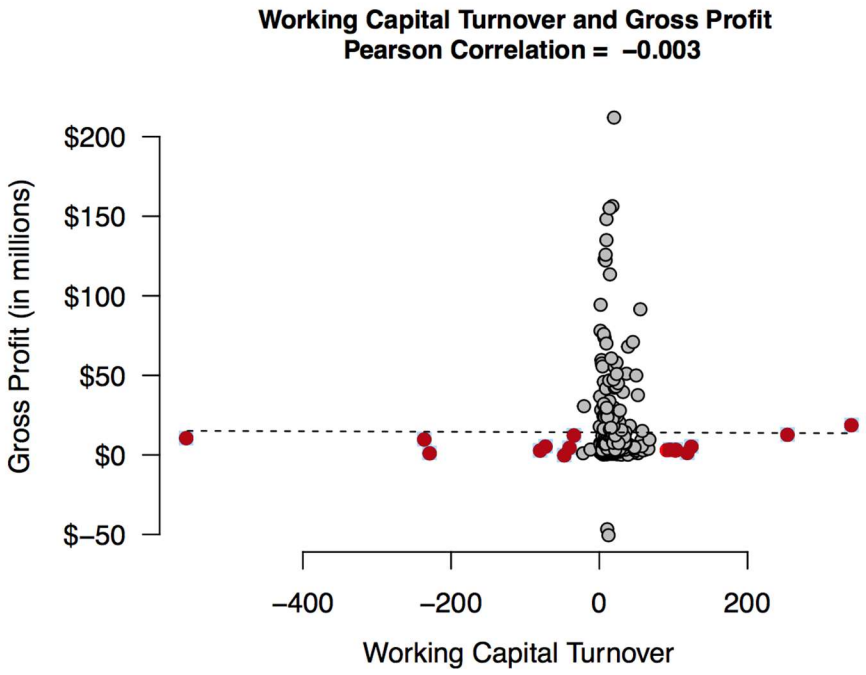
For the relationships this Thesis explored, a graph of the data overlaid with a line of best fit found by ordinary linear regression (OLS) is provided. OLS is closely related to Pearson correlation; the R^2 goodness-of-fit measure for regression with one independent variable equivalent to the square of the Pearson correlation coefficient. Fitting a regression line lends more credibility to any measures of correlation this Thesis provides.

Gross Profits

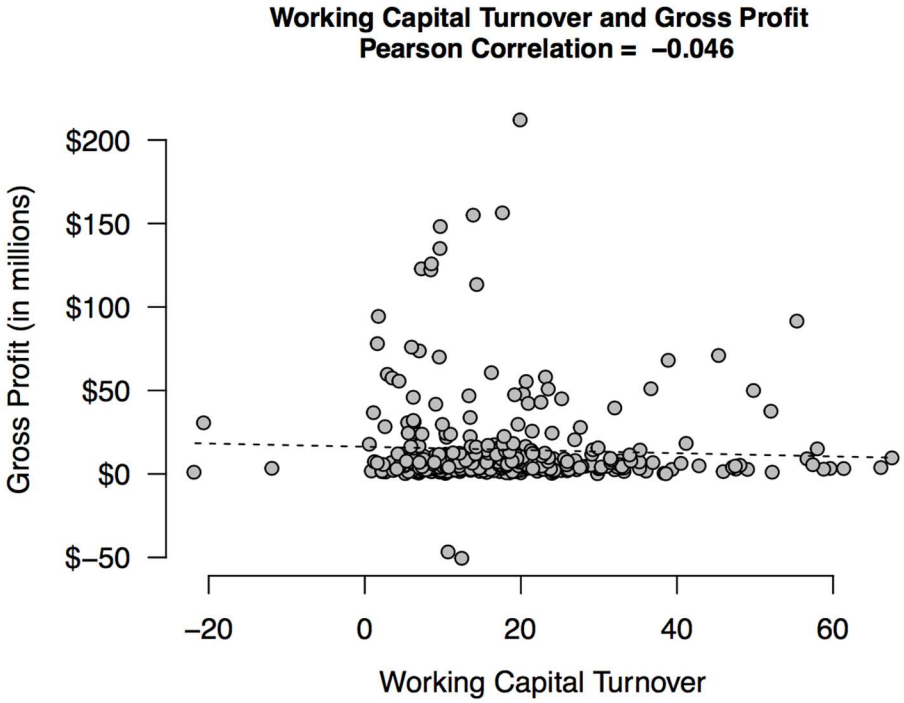
This Thesis began by examining the relationship between gross profits and working capital turnover. The Pearson correlation coefficient is nearly 0 and the

regression line is nearly completely flat, indicating that there is very little, if any effect of working capital turnover (WCT) on gross profit.

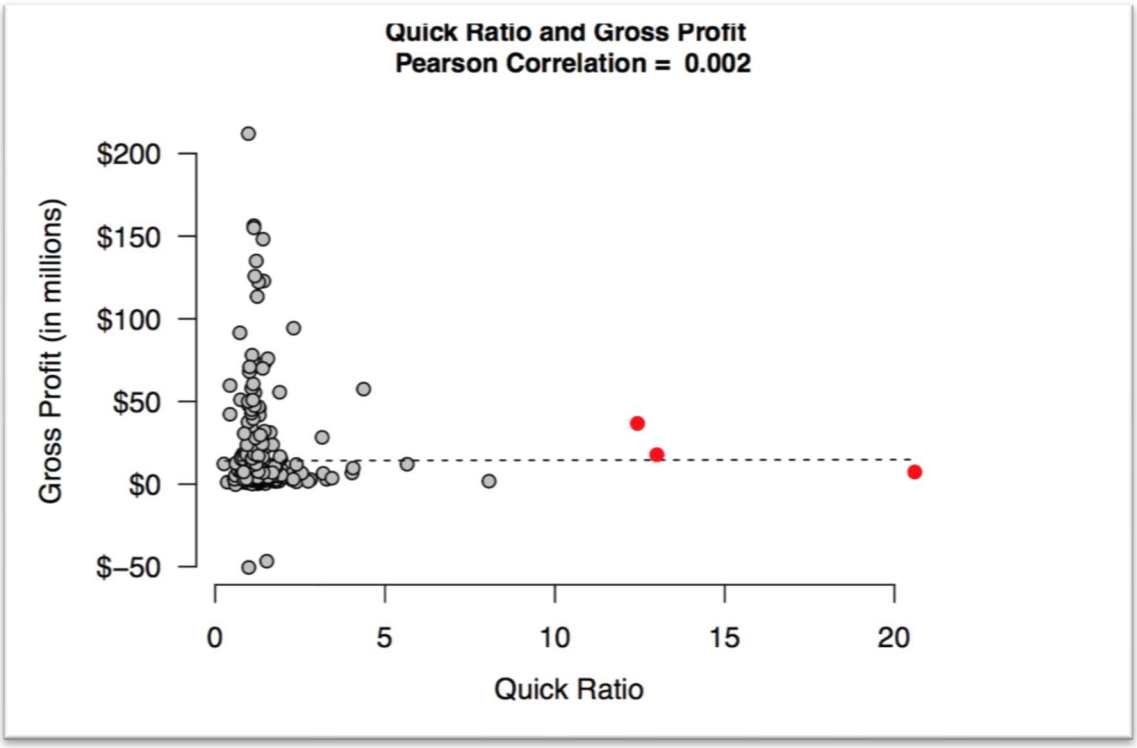
It can be seen that a few firms have very large working capital turnover while others have very small (negative) working capital turnover. These firms are seen as red dots on the graph. Often these outliers can have an overpowering effect when determining correlation and fitting a regression line. These influential points are often called leverage points. The term leverage is used as a formal definition for its influence. These data points (firms) can be removed to see if the results change.



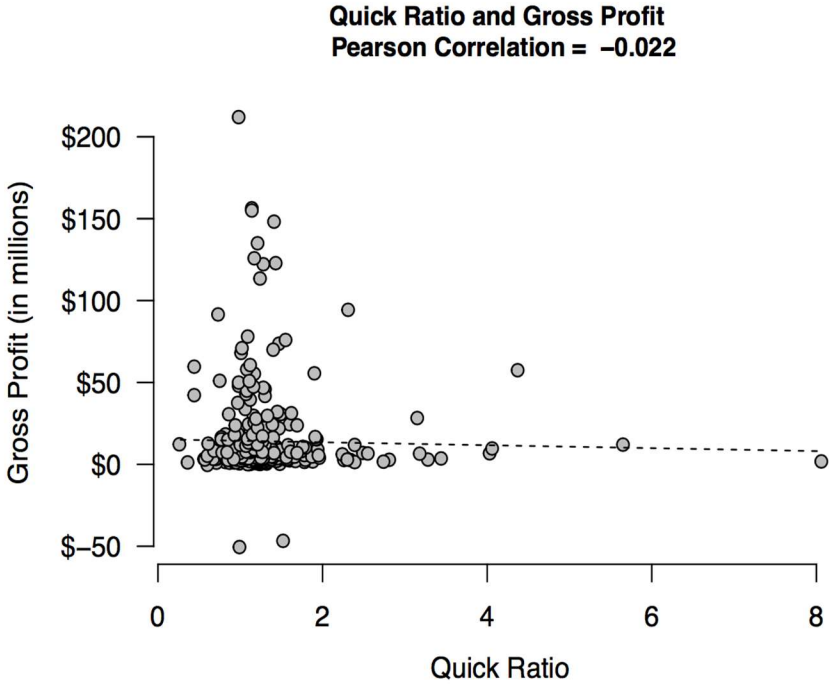
Removing these firms only has only a slight impact on the correlation. The relationship is not affected by these outliers and our conclusion does not change. Working capital turnover does not appear to influence gross profits.



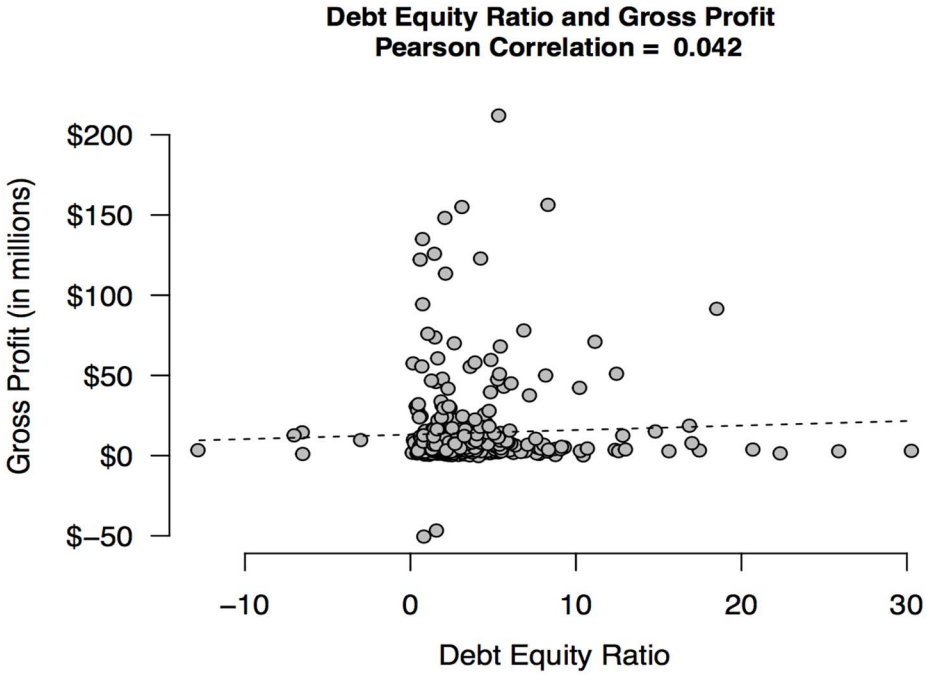
The process continued by analyzing the relationship between gross profit and quick ratio of a firm. Again, very little correlation between the two variables can be seen. The presence of firms with very large quick ratios (Outliers) are also noted. Using 10 as a cutoff for our leverage points, this Thesis re-plotted and calculated the correlation again.



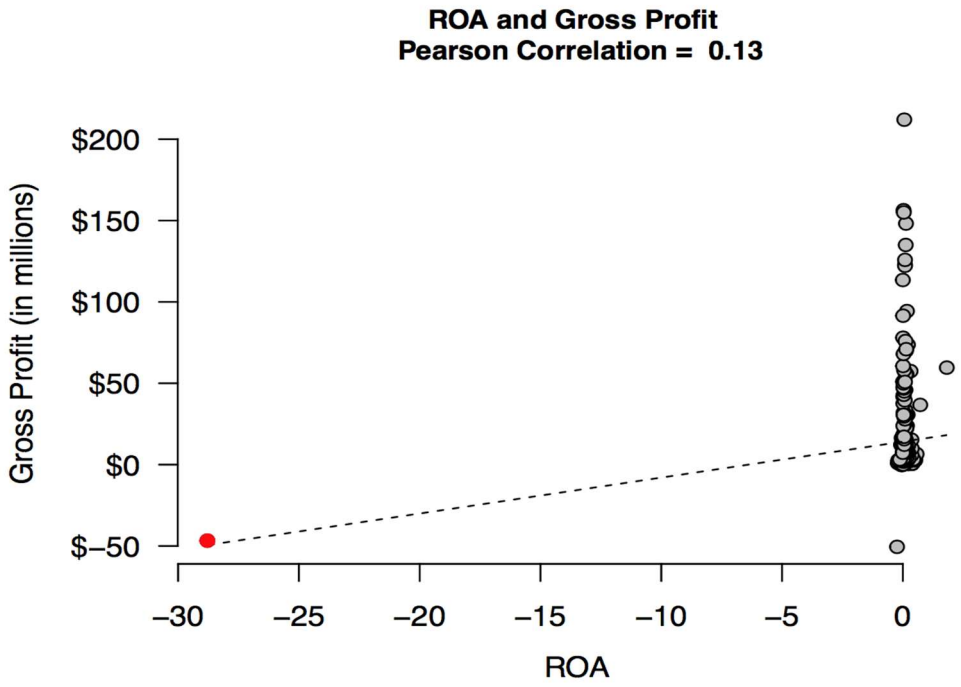
Still see no meaningful relationship between gross profit and quick ratio can be seen.

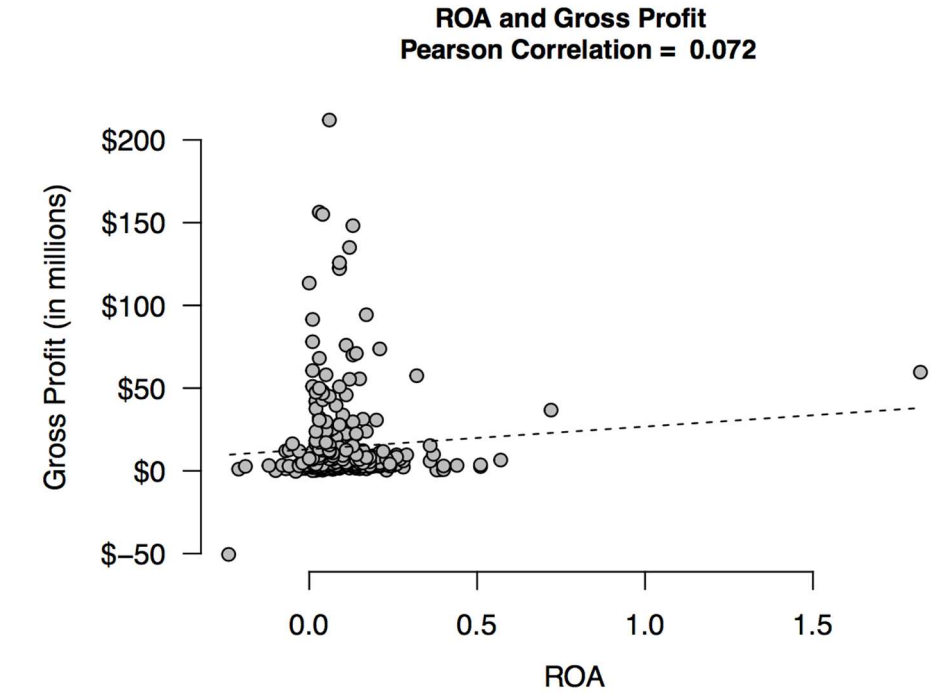


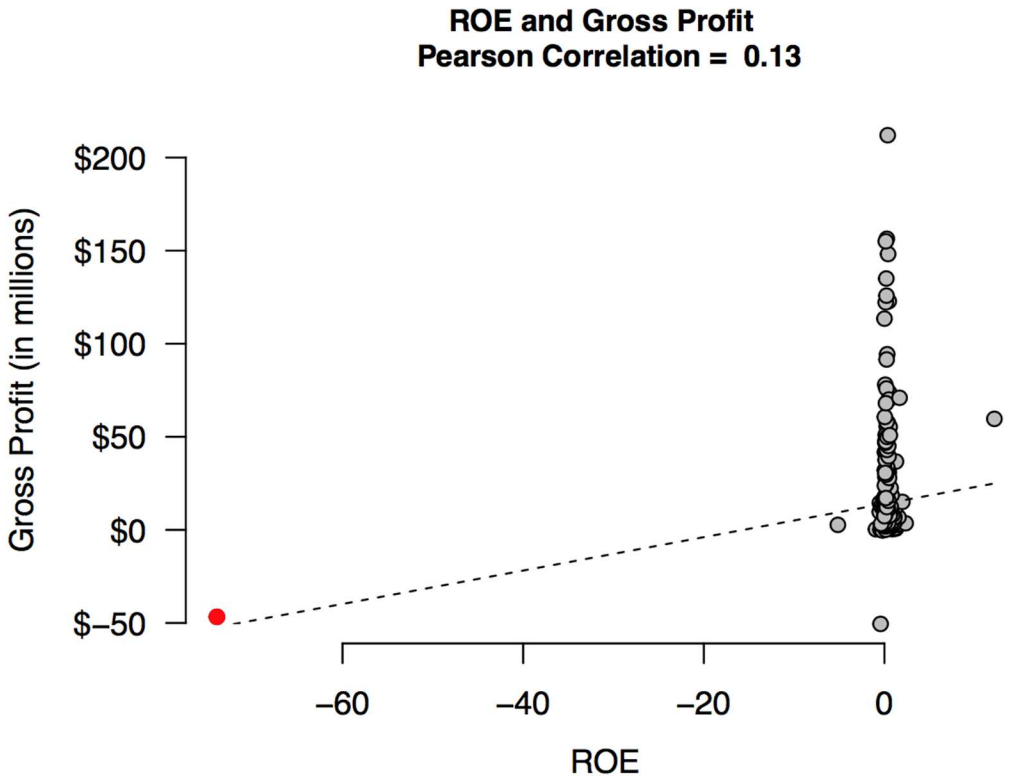
Debt-to-equity ratio and gross profit show no correlation.

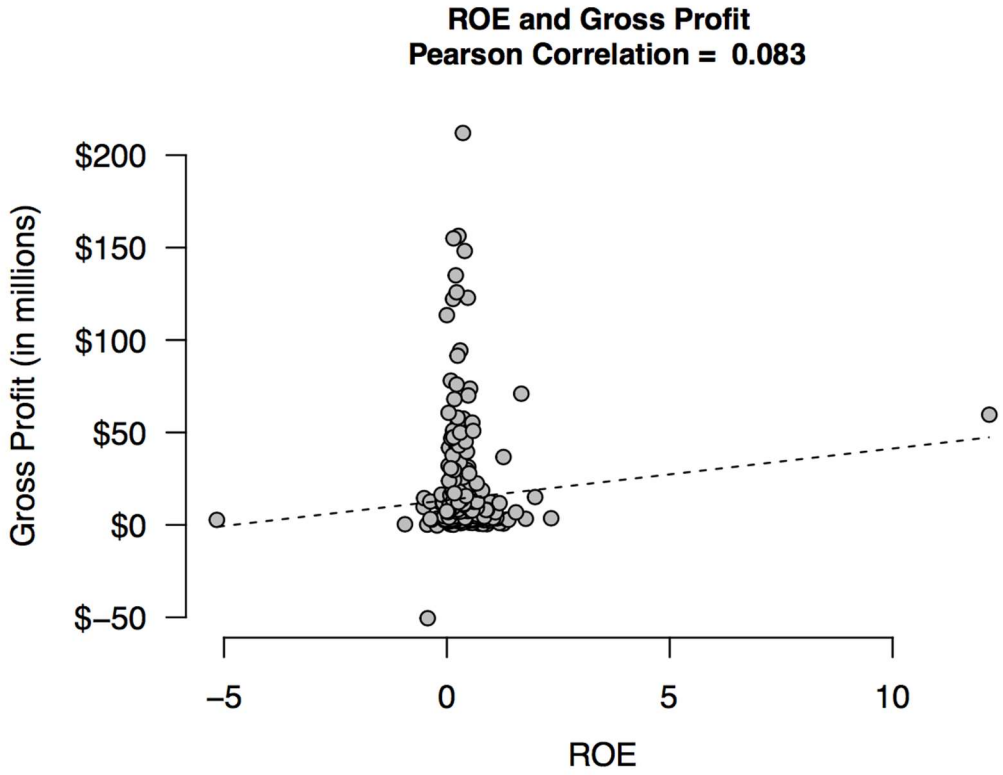


Return on Assets (ROA) and Return on Equity (ROE) however, show a small positive correlation. However, both of these relationships are lost after removing a single influential point.

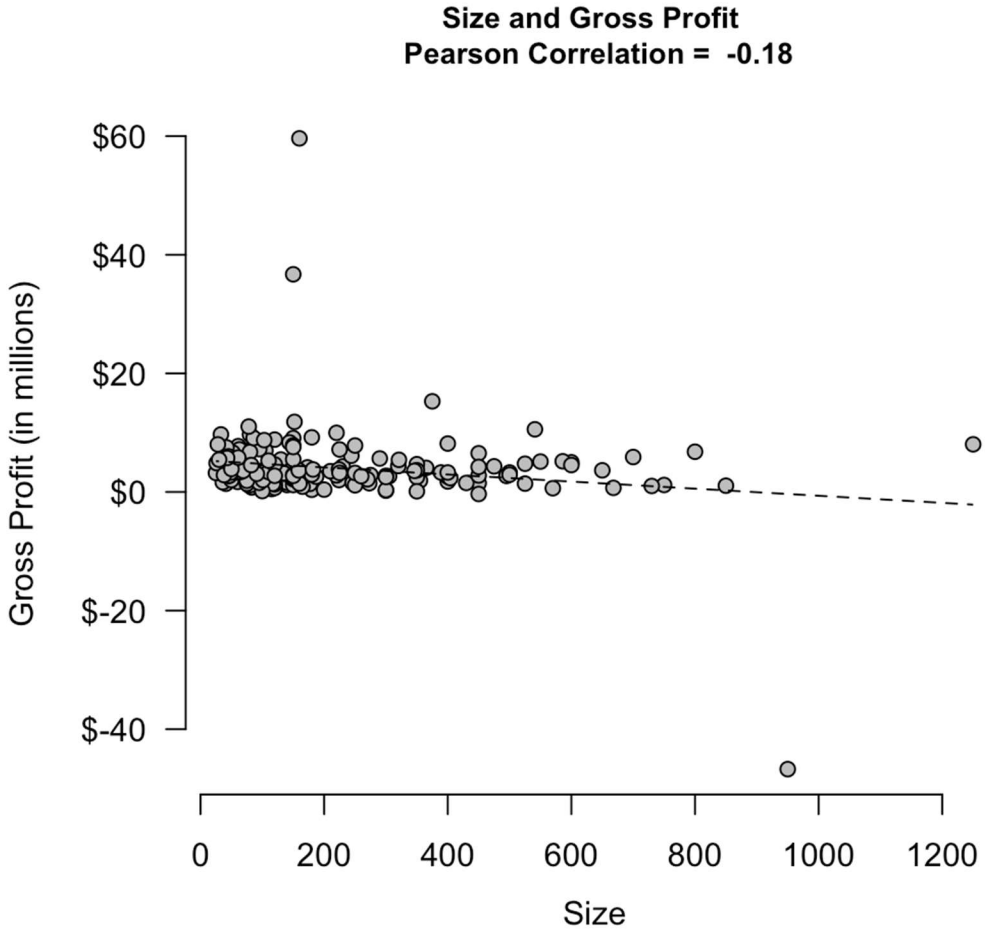

ROA and Gross Profit
Pearson Correlation = 0.13
Gross Profit (in millions)
$200
$150
$100
$50
$0
$−50
−30
−25
−20
−15
−10
−5
0
ROA


ROA and Gross Profit
Pearson Correlation = 0.072
Gross Profit (in millions)
$200
$150
$100
$50
$0
$−50
0.0
0.5
1.0
1.5
ROA


ROE and Gross Profit
Pearson Correlation = 0.13
Gross Profit (in millions)
$200
$150
$100
$50
$0
$−50
−60
−40
−20
0
ROE



A modest negative relationship between the size of a company and their gross profit can be seen here.



The correlations are summarized in Table 1.

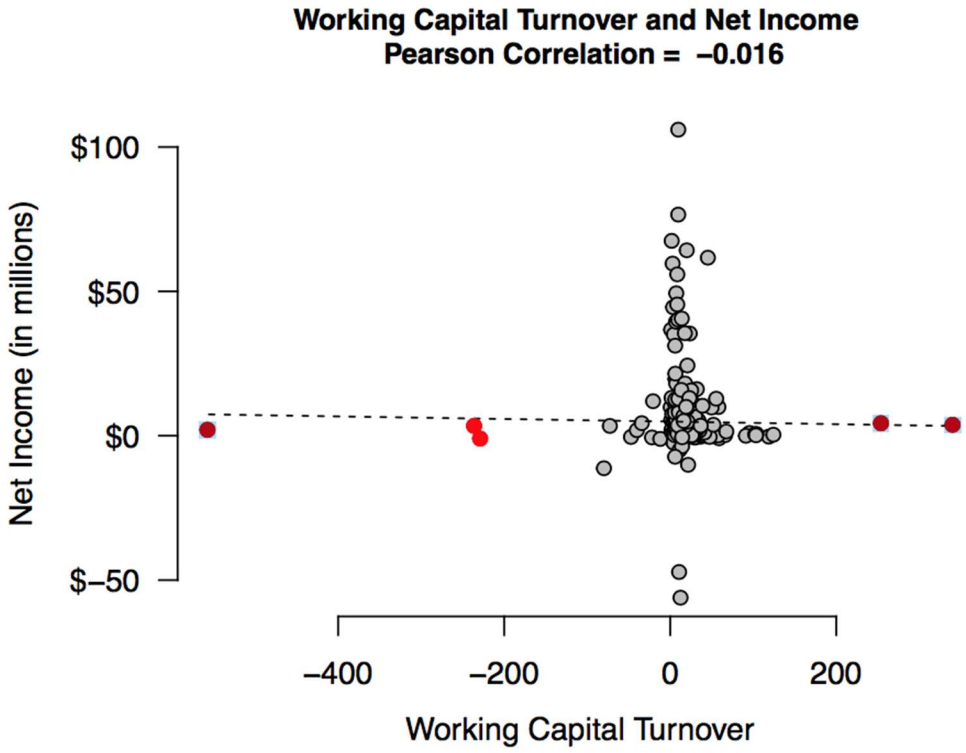
	Gross Profit	Outliers Removed
Working Capital Turnover	−0.003	−0.046
Quick Ratio	0.002	−0.022
Debt Equity Ratio	0.042	N/A
Return on Assets	0.13	0.072
Return on Equity	0.13	0.083
Size	-0.18	N/A

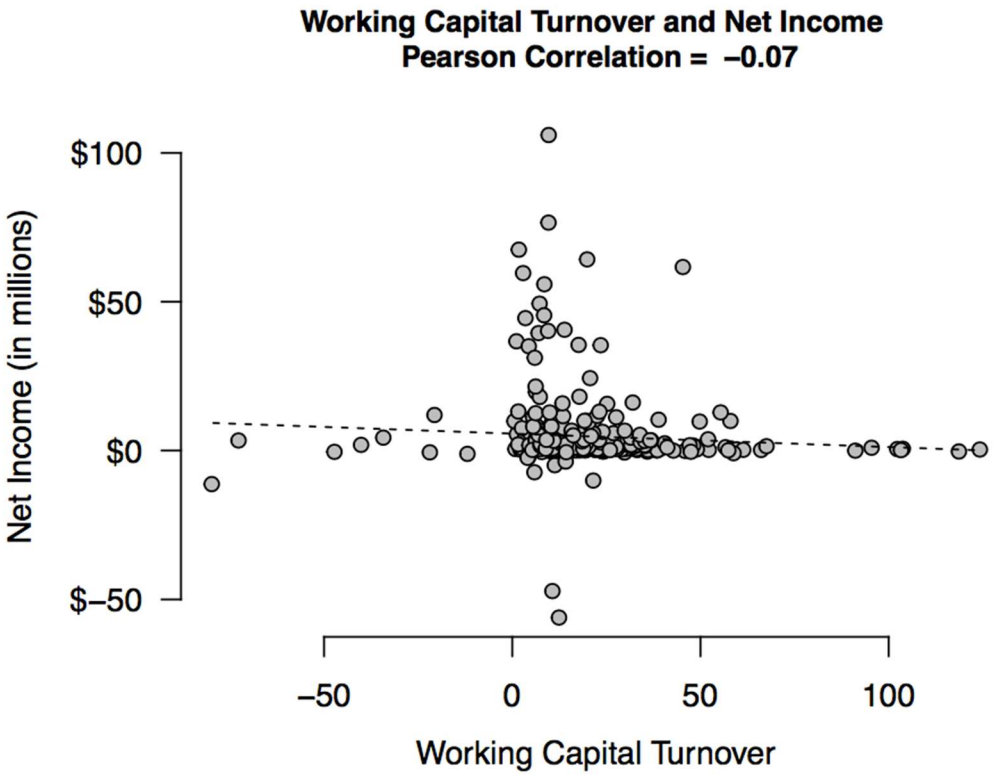
Table 1: Correlation between financial variables of interest and gross profit

Net Income Before Income Taxes

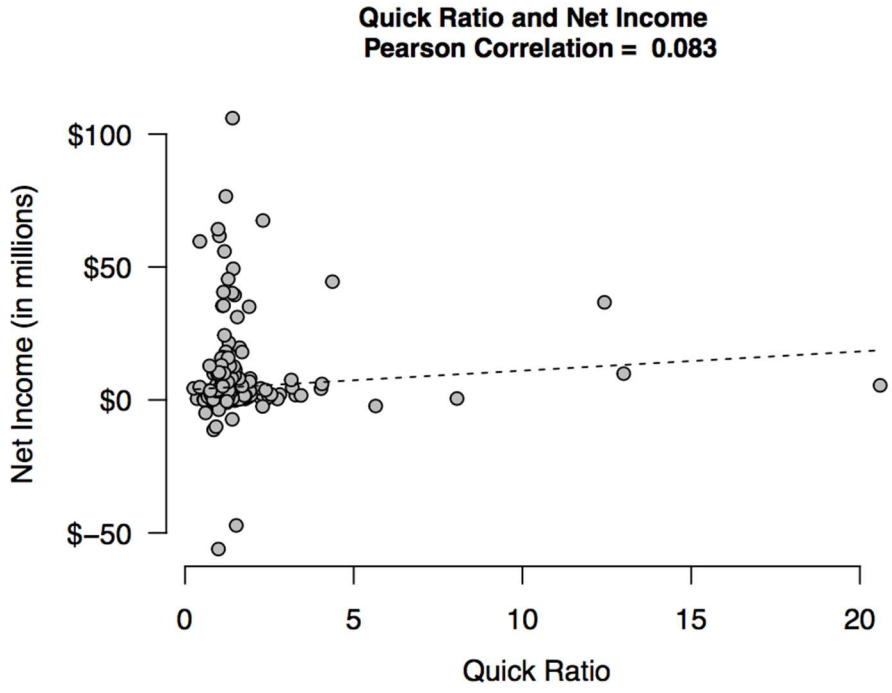
Next this Thesis analyzed the net income before taxes (NIBT) data in an identical manner as the gross profit data. There are, however, fewer points of high leverage. Most variables need no alteration before calculating correlation.

This analysis showed no relationship between net income and working capital turnover. Removing possible leverage points results in only a marginal increase in correlation.

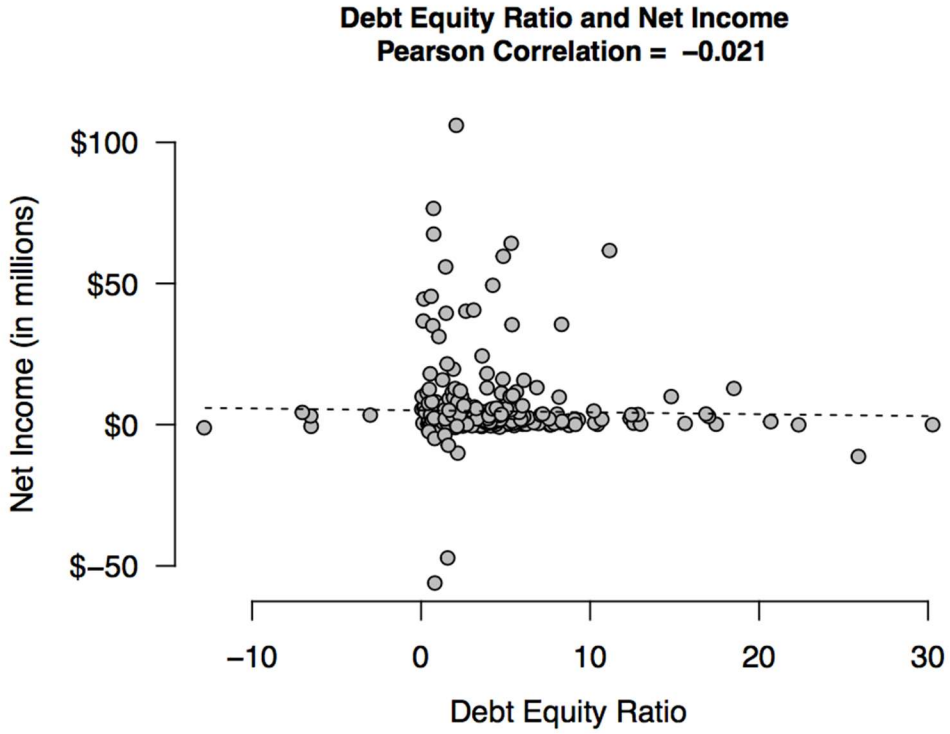




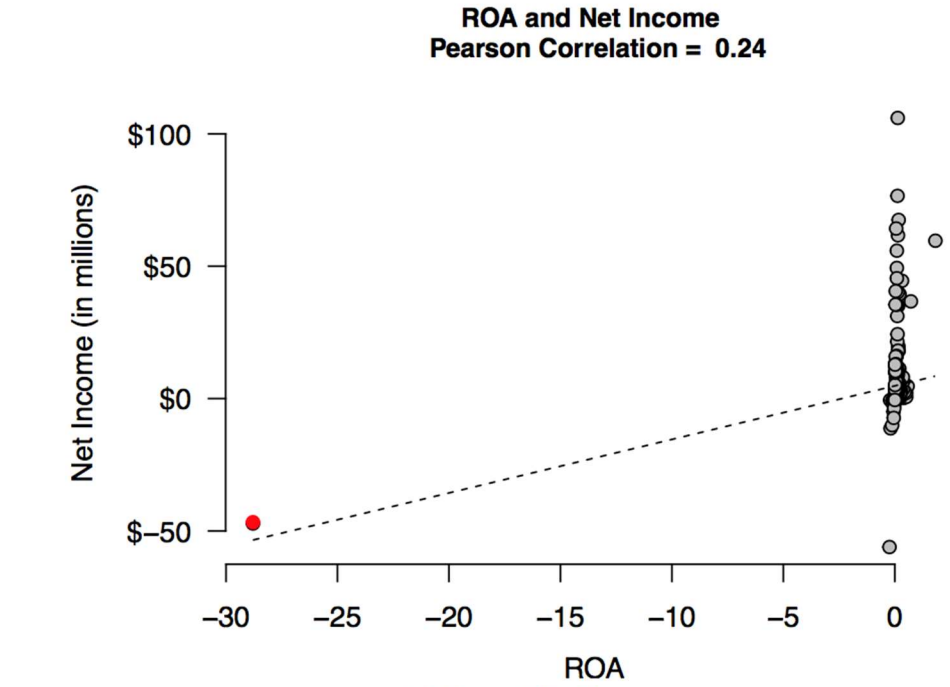
Again, essentially no correlation between quick ratio and net income was found.

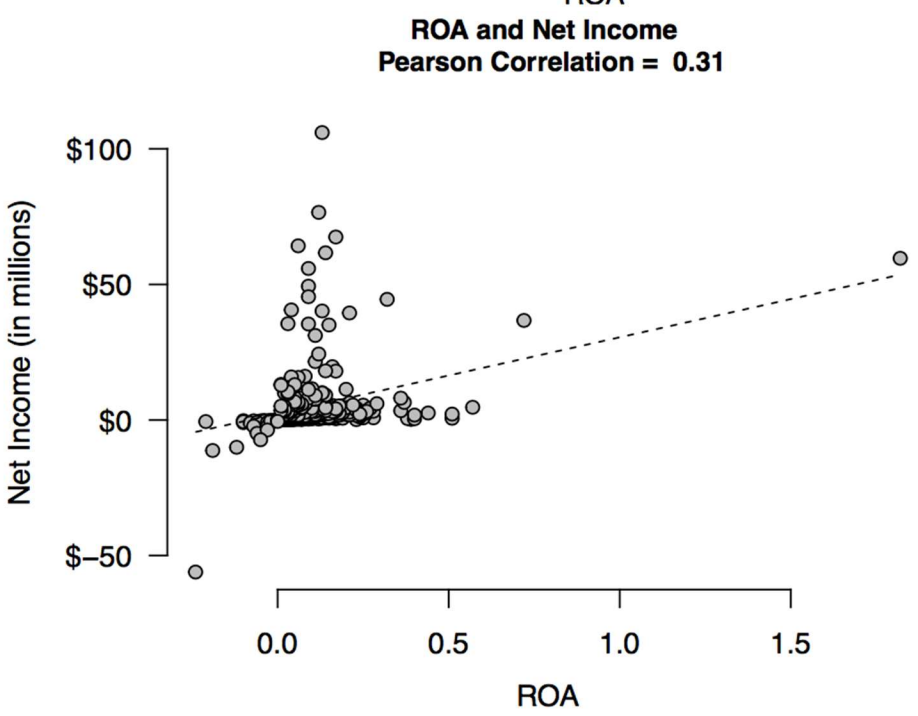


There is no observable relationship between net income and debt equity ratio



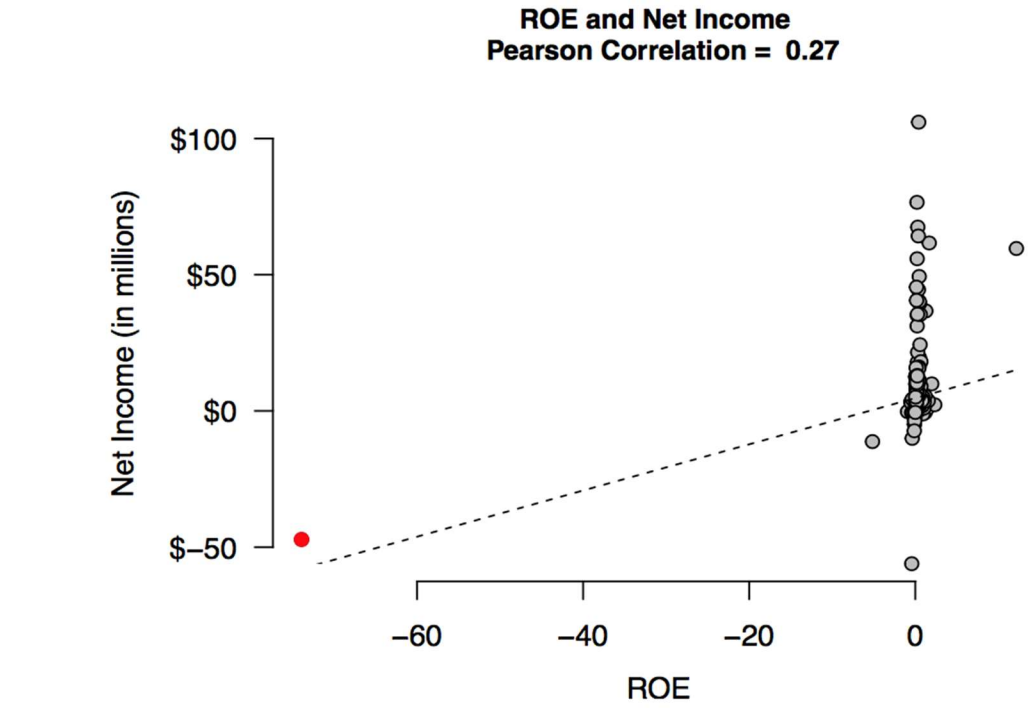
There is a modest correlation between a firm's net income and a firm's return on investment. A point of possible high leverage was noted. Removing this point increases the correlation between the two factors.

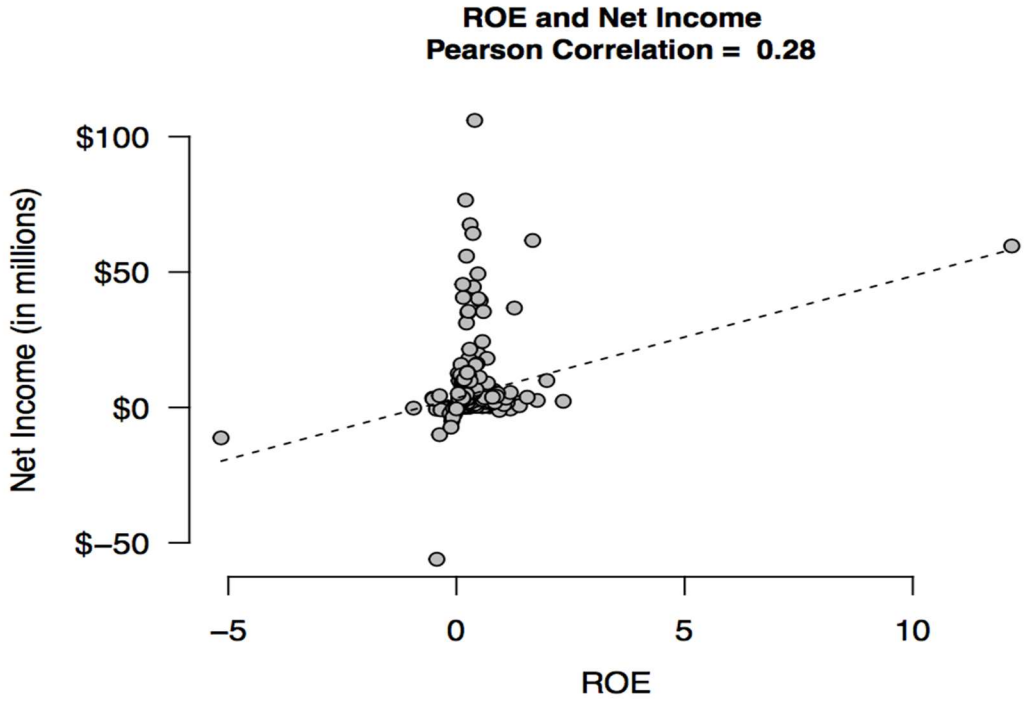




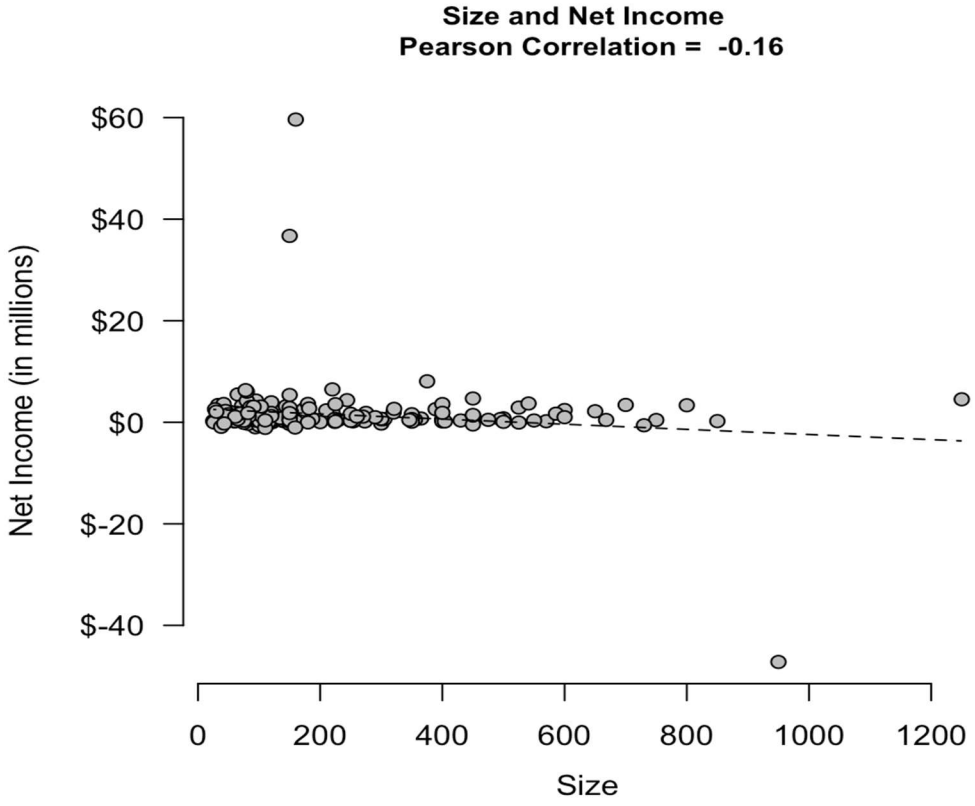
A modest correlation between net income and ROE was observed. To remove possible points of leverage the data was re-plotted and recalculated to observe the

correlation without the single firm that had a very low ROE. Refitting without this firm results in a small increase in correlation.





Finally, a modest correlation between size and net income was observed.



The correlations are summarized in Table 2.

	Net Income before Taxes	Outliers Removed
Working Capital Turnover	-0.016	-0.07
Quick Ratio	0.083	N/A
Debt Equity Ratio	−0.021	N/A
Return on Assets	0.24	0.31
Return on Equity	0.27	0.28
Size	-0.16	N/A

Table 2: Correlation between financial variables of interest and gross profit

Discussion

Overall gross profit and net income do not have an observable relationship with most of the financial variables of interest. In Table 1 and Table 2, this Thesis noted that the correlation between net income as well as gross profit is nearly 0 for working capital ratio, quick ratio, and debt equity ratio. A modest positive relationship between net income and gross profit with both ROE and ROA was observed.

Most of the plots show a clustering of points with no obvious structure. Often the best fitting regression line is a straight horizontal line. This is a clear indication of a lack of correlation. Again, the exceptions to this phenomenon are ROE and ROA which show graphically a positive relationship.